REMEDIAL ACTION CONTRACT 2
IN REGION 5

FINAL REMEDIAL DESIGN
FOR 120 ZONE 3 PROPERTIES AND CARRIE GOSCH ELEMENTARY SCHOOL

U.S. SMELTER AND LEAD RESIDENTIAL AREA SUPERFUND SITE
EAST CHICAGO, LAKE COUNTY, INDIANA

Prepared for:
U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 5
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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order of Consent
ARAR	Applicable or Relevant and Appropriate Requirements
ARCO	Atlantic Richfield Company
bgs	Below ground surface
BMPs	Best management practices
CAMU	Corrective action management unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CQAP	Construction Quality Assurance Plan
COC	Constituent of concern
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
ESAT	Environmental Services Assist Team
FIELDS	Field Environmental Decision Support
FS	Feasibility Study
ft	Foot, feet
GIS	Geographic Information System
HASP	Health and safety plan
HRS	Hazard Ranking System
IAC	Illinois Administrative Code
IDEM	Indiana Department of Environmental Management
IDW	Investigation derived waste
LDC	Laboratory Data Consultants, Inc.
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable unit
PAH	Polycyclic aromatic hydrocarbon
Parsons	Parsons Corporation

ACRONYMS AND ABBREVIATIONS (CONTINUED)

RA	Remedial Action
RAL	Remedial action level
RAO	Remedial action objective
RAWP	Remedial Action Work Plan
RCI	Resource Consultants, Inc.
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
RI	Remedial investigation
RI/FS	Remedial investigation/feasibility study
ROD	Record of Decision
RP	Responsible Party
RSL	Regional Screening Level
SDG	Sample Delivery Group
STAT	STAT Analysis Corporation
SulTRAC	Joint venture of SCST, Inc. and Tetra Tech, Inc. also referred to as Engineer in this Design Report
SWPPP	Stormwater pollution prevention plan
T&D	Transportation and disposal
TC	Toxicity characteristic
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time Critical Removal Action
Tech Memo	Technical memorandum
TMP	Transportation Management Plan
TODP	Transportation and Off-Site Disposal Plan
USGS	United States Geological Survey
USS Lead	U.S. Smelter and Lead Refinery
VOC	Volatile organic compound
XRF	X-ray fluorescence
yds^3	Cubic yards

1. INTRODUCTION

The U.S. Environmental Protection Agency, Region 5 (EPA) contracted SulTRAC to prepare the remedial design (RD) for Zone 3 of the residential portion, Operable Unit 1 (OU1) of the U.S. Smelter and Lead Refinery Superfund Site (USS Lead Site) located in East Chicago, Lake County, Indiana. This RD was prepared under work assignment (WA) No. 198-RDRD-053J (EPA 2016) under Contract No. EP-S5-06-02. This remedial design report provides a history of the site and remedial designs and specifications for the remedial action (RA) at 120 properties (including 36 high-priority and 84 lower-priority properties) within Zone 3 of the USS Lead Site and the Carrie Gosch Elementary School, located at 455 E 148th Street within Zone 1. In addition, 19 designs that were previously submitted electronically are included in this report. These 19 additional properties have already been remediated but remedial designs have not been formally submitted in a document; they are included here only for formal documentation. Attempts to gain access to un-sampled properties are on-going in Zone 3. Designs for 92 properties in Zone 3 that have already been sampled but are not included in this document as well as any new properties that are sampled later will be provided at a later date.

The USS Lead Site is comprised of two operable units. Operable Unit 2 (OU2) is the U.S. Smelter and Lead Refinery facility, located on a 79-acre tract of land in East Chicago, Indiana, and groundwater. OU1 is comprised of nearby commercial, municipal, and residential properties north of OU2. The contaminants of concern at the site are lead and arsenic.

OU1 is divided into three distinct geographic areas (Zones 1, 2, and 3), which are illustrated in Figure 1-1. Zone 3 is defined by the consent decree (U.S. Smelter and Lead Refinery Consent Decree, Pg. 8, ¶ww., Sept. 3, 2014, ECF 2:14-cv-00312 Doc. 2-1) as follows:

> Zone 3 is generally bordered: (1) on the north by Chicago Avenue; (2) on the east by Parrish Avenue; (3) on the south by the northern edge of the railroad right of way located generally to the south of East 149th Place and labeled on Appendix D as “Elgin Joliet and Eastern Rlwy”; and (4) on the west by the eastern edge of the railroad right of way that runs principally north and south and is labeled … as “Elgin Joliet and Eastern Rlwy.” The triangular plot of land bounded by several railroad spurs in the southeastern portion of the area … is a part of Zone 3.

The RA will be implemented in accordance with the Record of Decision (ROD) that was issued by EPA in November 2012 (EPA 2012b). The selected remedy in the ROD for the site is excavation and off-site disposal of contaminated soils and restoration of affected properties to pre-remediation conditions with clean backfill, topsoil in the upper four to six inches, and landscaping. Soils beneath streets, sidewalks, driveways, and other impervious surfaces are not addressed by the ROD and are therefore not addressed by this RD. The remedial action levels (RALs) are defined in the ROD as 400 milligrams per kilogram (mg/kg) for lead at residential properties, 800 mg/kg for lead at industrial/commercial properties, and 26 mg/kg for

arsenic at both residential and industrial/commercial properties. High priority properties in Zone 3 were defined as properties where the concentrations in the zero-to-six-inch depth interval of soils exceeded 1,200 mg/kg and/or arsenic concentrations exceeded 68 mg/kg, which poses an imminent and substantial threat to human health. In addition, properties where the access agreements indicate that children younger than seven years old are present were considered high priorities if soils in the zero-to-six-inch depth interval met or exceeded remedial goals of 400 mg/kg for lead and/or 26 mg/kg for arsenic. Thirty-two of the designs included in this document are considered high priority due to the presence of children, three designs are considered high priority on the basis of concentrations only (i.e. children are not known to be present), and one design had both high concentrations and the presence of children.

1.1 PURPOSE

This RD report summarizes the results of pre-design studies and presents the designs to implement the selected remedy at the Site. This report includes the conceptualization of the major engineering decisions necessary to implement the remedy.

1.2 SITE DESCRIPTION

1.2.1 Site Location

The USS Lead Site lies approximately 18 miles southeast of Chicago, Illinois, in East Chicago, Indiana (Figure 1-1). The USS Lead Superfund Site consists of the former lead smelter located at 5300 Kennedy Avenue, East Chicago, Indiana (OU2) and the commercial, municipal, and residential area to the north (OU1). East Chicago is located within one of the most heavily industrialized areas in the United States, including facilities such as steel mills, oil refineries, heavy manufacturing plants, chemical processing plants, and heavy rail. OU1 is bound by East Chicago Avenue on the north, East 151st Street/149th Place on the south, the Indiana Harbor Canal on the west, and Parrish Avenue on the east (Figure 1-1). OU1 is primarily a residential area, with commercial and light industrial areas nearby.

1.2.2 Site Background

United States Geological Survey (USGS) historical aerial photographs from 1939, 1951, 1959, and 2005 show OU1 over time (Figure 1-2). Review of these aerial photographs indicates that the majority of the residential neighborhoods within the USS Lead Site, west of the railroad tracks, were built before 1939. Because OU1 is a former low-lying area, the ground level was likely built up before 1939, before the homes were constructed. Approximately half of the homes east of the railroad tracks were built before 1939. Between 1939 and 1951, approximately 75 to 80 percent of the homes were built; and by 1959, most of the homes east of the railroad tracks had been built. These photographs also show that the Anaconda Copper

Company (currently the Atlantic Richfield Company [ARCO]) occupied the area where both Gosch Elementary School and the East Chicago Public Housing complex immediately south of the school are currently located (the southwest portion of OU1). The Gosch Elementary School and the East Chicago Public Housing complex were built on the former Anaconda Copper Company site after 1959.

The former USS Lead smelter is located directly south of the OU1 residential area. Immediately east of the former USS Lead smelter, across Kennedy Avenue, is the former DuPont site (currently leased and operated by W.R. Grace & Co., Grace Davison). One of the processes that historically took place at the DuPont site was the manufacturing of the pesticide lead arsenate. Northwest of the former lead smelter, west of Gladiola Street and north of 151st Street, two smelter operations reportedly handled lead and other metals (Geochemical Solutions 2004). A 1930 Sanborn Map identifies the operations as Anaconda Lead Products and International Lead Refining Company (referred to as the former Anaconda facility, currently owned by ARCO) (Geochemical Solutions 2004). According to the Sanborn Map, Anaconda Lead Products was a manufacturer of white lead and zinc oxide and the International Lead Refining Company was a metal refining facility. These facilities consisted of a pulverizing mill, white lead storage areas, a chemical laboratory, a machine shop, a zinc oxide experimental unit building and plant, a silver refinery, a lead refinery, a baghouse, and other miscellaneous buildings and processing areas. The location of the former Anaconda plant is presented in Figure 1-2.

1.3 SITE HISTORY

The following section describes the history of industrial activities and investigations at the USS Lead Site. A graphic representation of the timeline of events at OU1 is presented in the remedial investigation (RI) (SulTRAC 2012a).

The USS Lead smelter was constructed in the early 1900s by the Delamar Copper Refinery Company to produce copper. In 1920, the property was purchased by U.S. Smelting, Refining, and Mining, and later by USS Lead. At that time, USS Lead operated a primary lead smelter at the facility. An electrolytic process called the “Betts process” was used for refining lead into high-purity lead at the Site. In the Betts process, 400-lb anodes of primary lead bullion were placed in tanks containing cathodes, anodes, and a solution of lead fluosilicate and free hydrofluosilicic acid. During electrolysis, impurities in the primary lead bullion accumulated on the anode and lead deposited on the cathode. The cathode was then removed, re-melted, and treated with compressed air to oxidize and float any remaining impurities, and the purified lead was cast into lead “pigs.” The Betts process volatilized metals, including arsenic, during production (Resource Consultants, Inc. [RCI] 1990).

Between 1972 and 1973, the USS Lead smelter was converted to a secondary lead smelter which recovered lead from scrap metal and automotive batteries. A 100-ton furnace produced one-ton lead blocks and smaller 12-lb pigs. The lead blocks and pigs were subsequently melted and refined to soft lead, antimony lead, and calcium lead. Metal alloys used in the refining process included silver, copper, tin, antimony, and arsenic. All operations at the USS Lead smelter were discontinued in 1985.

Two primary waste materials were generated as a result of the smelting operations: (1) blast-furnace slag and (2) lead-containing dust emitted from the blast-furnace stack. Blast-furnace slag was stockpiled south of the plant building and spread over an adjoining 21 acres of wetlands once per year. The blast furnace baghouse collected approximately 300 tons of flue dust per month during maximum operating conditions. Some of the collected flue dust was recycled back into the furnace for additional lead recovery; however, not all of the dust could be recycled without a significant reduction in furnace efficiency. By the late 1970s, approximately 8,000 tons of collected flue dust was stored onsite (RCI 1990).

In 1975 and 1985, USS Lead Facility received a National Pollutant Discharge Elimination System (NPDES) permit to discharge cooling water and storm water runoff to the Grand Calumet River. According to the Indiana Department of Environmental Management (IDEM), such discharges exceeded permit levels for several compounds (EPA 2009a). In the 1980s, several state and federal enforcement actions were taken against the company. In September 1985, the Indiana State Board of Health found USS Lead in violation of State law because lead particles were found downwind of the facility (EPA 2009a). All industrial operations at USS Lead Facility ceased in 1985 (EPA 2009a).

On November 18, 1993, EPA and USS Lead entered into an Administrative Order of Consent (AOC) pursuant to Section 3008(h) of the Resource Conservation and Recovery Act (RCRA). The AOC required USS Lead to implement interim measures, including site stabilization and construction of a corrective action management unit (CAMU) to contain contaminated soils and slag, and to conduct a Modified RCRA Facility Investigation at USS Lead Facility (Geochemical Solutions 2001). The CAMU covers approximately 10 acres and is surrounded by a subsurface slurry wall. Excavation and construction of the CAMU was conducted in two phases and completed between August and September 2002 (Geochemical Solutions 2004). The baghouse dust and bags were removed from the site pursuant to the IDEM Partial Interim Agreed Order in Cause No. N-296 and were sent offsite for secondary lead recovery. Slag generated from the blast-furnace operations was placed in piles on the southern portion of the property. The cleanup of slag was described in the Interim Stabilization Measures Work Plan prepared by ENTACT, LLC and was completed during the third quarter of 2002 (Geochemical Solutions 2004).

As part of a RCRA Corrective Action in 2003 and 2006, EPA conducted soil sampling in OU1 of the USS Lead Site. In the late July and early August 2003 investigation, 83 residential properties within OU1 were sampled and analyzed for lead using a Niton X-ray fluorescence (XRF) instrument. Soils from 43 locations (52 percent) exceeded the 400 milligrams per kilogram (mg/kg) residential soil screening criterion for lead. In 2006, EPA's Field Environmental Decision Support (FIELDS) team supplemented the work performed in 2003 by collecting additional data from 14 properties sampled in 2003 to (1) assess whether the top-most soils (zero to one inch below ground surface [bgs]) had elevated lead concentrations relative to deeper soils (one to six inches bgs), (2) collect and compare composite samples to individual samples to assess whether composite samples accurately represented the concentrations in residential yards and parks, and (3) compare lead concentrations in the fine and coarse fractions of sieved samples to evaluate whether lead was preferentially distributed in the fine-grain sizes (SulTRAC 2012a).

On January 22, 2008, EPA conducted a time-critical removal action (TCRA) for private residential properties within OU1 due to elevated levels of lead in surface soils identified during investigations conducted from 2002 through 2007 (Weston 2009). EPA identified 15 private properties that contained soil with lead concentrations exceeding the regulatory removal action level of 1,200 mg/kg in the top six inches of soil. Lead in surface soils in concentrations greater than 1,200 mg/kg poses an imminent and substantial threat to human health. EPA's emergency response program addressed these most highly-contaminated parcels. EPA was able to obtain access agreements to only 13 of the 15 properties. The properties were remediated between June 9th and September 22nd, 2008, by EPA's contractors Weston Solutions, Inc. (Weston) and Environmental Quality Management (EQM), under a TCRA. The properties were excavated to a depth of one to two-and-a-half feet bgs. Weston used an XRF instrument to field screen and confirm that excavation was completed to a depth where lead concentrations were below 400 mg/kg. The excavated properties are highlighted in gray on Figure 1-3. All the properties were backfilled with clean fill and re-sodded by September 25th, 2008. A total of 1,838 tons of soil was transported offsite to a landfill facility as special waste (Weston 2009).

The USS Lead Site was evaluated under the Hazard Ranking System (HRS) in September 2008; this evaluation indicated that there was an observed release of lead in the air-migration pathway as well as in the surface-water migration pathway (EPA 2008). The USS Lead Site was listed as a Superfund site on the National Priorities List (NPL) on April 8th, 2009.

In 2009, U.S. EPA Superfund began a Remedial Investigation and Feasibility study. In 2010, the City of East Chicago remediated yards at two properties [redacted] were above the U.S. EPA residential screening level (RSL) for lead (400 mg/kg). The Remedial Investigation and Feasibility Study were completed in 2012 (SulTRAC 2012a; SulTRAC 2012b).

EPA completed a second TCRA of 16 additional properties in OU1 with lead in soil concentrations exceeding 1,200 mg/kg in the zero-to-six-inch soil interval from October to December 2011 based on sampling conducted during the RI completed by SulTRAC between 2009 and 2012. The TCRA consisted of removing lead-contaminated soil from five East Chicago Public Housing addresses and 11 residential properties (including two that were not remediated in the previous 2008 TCRA due to access issues). The TCRA was conducted between October 24th and December 9th, 2011. Approximately 1913 tons of lead-contaminated soil was excavated during the 2011 TCRA, and the material was sent to an off-site location for disposal. Each property was backfilled to grade and seeded after the soil removal was completed (EPA 2011a, 2011b, 2011c, 2011d).

The RI/FS Reports and the Proposed Plan for the USS Lead Site were made available to the public in early July 2012. After issuing the Proposed Plan, EPA held a public comment period between July 12th and September 12th, 2012. In addition, EPA held a public meeting on July 25th, 2012, to present the Proposed Plan to the community.

During Autumn of 2016, EPA completed a third TCRA of 38 additional properties in OU1 Zone 3 and 17 additional properties in OU1 Zone 2 with lead concentrations greater than 1,200 mg/kg or arsenic concentrations greater than 68 mg/kg in the zero-to-six-inch soil interval. The TCRA was based on available, validated sampling results from the sampling conducted by SulTRAC during 2015 and 2016. Sampling of Zone 2 and Zone 3 was still in process at properties with completed access agreements at the time of the 2016 TCRA. The excavated material was sent to an off-site location for disposal, and each property was backfilled to grade and re-sodded after the soil removal was completed

1.4 Selected Remedy and Remedial Action Objectives for OU1

In November 2012 EPA, with the concurrence of the State of Indiana, selected a remedy for the Site and documented that decision in the ROD for OU1 (EPA 2012). OU1 contains residential yards contaminated with lead and arsenic at levels that pose a threat to human health via ingestion, inhalation and direct contact. The ROD-selected remedy is excavation of soil exceeding RALs, off-site disposal, and optional ex-situ treatment (Remedial Alternative 4A presented in the Final Feasibility Study Report [SulTRAC 2012b]). The RALs at OU1 are 400 milligrams per kilogram (mg/kg) for lead at residential properties, 800 mg/kg for lead at industrial/commercial properties, and 26 mg/kg for arsenic at both residential and industrial/commercial properties.

EPA selected Alternative 4A in the ROD because it meets the remedial action objective (RAO) of reducing exposure of residents to contaminated soils that pose a health risk by removal and offsite disposal of those

soils. Alterative 4A requires fewer restrictions on future use of properties than other alternatives. Alternative 4A also reduces risk within a more reasonable timeframe and at a lower cost than the other excavation alternative (Alternative 4B), and provides for long-term reliability of the remedy.

Based on the information available, EPA and the State of Indiana stated that the selected remedy will (1) be protective of human health and the environment, (2) comply with applicable or relevant and appropriate requirements (ARARs), (3) be cost-effective, and (4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it will treat those soils constituting principal threats, the remedy also will meet the statutory preference for the selection of a remedy that involves treatment as a principal element.

The selected remedy achieves protectiveness by removing impacted soil that exceeds RALs to a depth of 24 inches bgs, while leaving in place soils with concentrations below the RALs and soils above the RALs at depths greater than 24 inches. The excavated soils will be transported off-site for disposal. Excavated soil that exceeds the toxicity characteristic (TC) regulatory threshold will be chemically stabilized prior to disposal.

1.5 COMMUNITY INVOLVEMENT

The RI and FS Reports (SulTRAC 2012a; SulTRAC 2012b) and the Proposed Plan for the USS Lead Site (EPA 2012a) were made available to the public in July 2012. These documents can be found in the Administrative Record maintained at the EPA Docket Room in Chicago, Illinois, and at East Chicago, Indiana, public libraries located on 1008 W. Chicago Avenue and 2401 E. Columbus Drive. After issuing the Proposed Plan, EPA held a public comment period between July 12th and September 12th, 2012. In addition, EPA held a public meeting on July 25th, 2012, to present the Proposed Plan to a community audience. When the Proposed Plan was issued, EPA mailed a fact sheet to the area residents informing them about the Proposed Plan. The fact sheet advised residents that the RI, FS, and Proposed Plan were available for viewing at the public repositories listed above and included the date, time, and location of the public meeting. At the public meeting, EPA and IDEM representatives answered questions about the site and the remedial alternatives. EPA's responses to the comments received during the public comment period are included in the Responsiveness Summary, which is Part 3 of the ROD.

In July 2016 EPA went door-to-door in Zone 1 and left lead prevention flyers at each residence, placed “Do not play in dirt or mulch” signs throughout the neighborhood, and distributed a fact sheet entitled “EPA Takes Action to Reduce Exposure to Lead in Soil.” EPA established a command post in Zone 1 in July 2016 for community outreach personnel to be available to meet with OU1 residents and discuss questions

or concerns. Open house community meetings to inform area residents of the upcoming removal action and answer questions were held in August and September 2016. In September 2016, EPA distributed a fact sheet entitled "EPA to Begin Cleaning Up Lead-Contaminated Yards." In December 2016, EPA distributed a fact sheet entitled "Excavation to End for Winter; Community Activities Continue." EPA continues to hold public meetings and conduct public outreach to inform the community about the remedial process and methods to avoid exposure to contaminated soils. The most recent public meeting was January 28, 2017.

2. BASIS OF DESIGN

This section presents the technical details and design assumptions of the OU1 Zone 3 RD. SulTRAC conducted the RD in accordance with the SOW dated June 17th, 2014 (EPA 2014) and the Work Plan submitted July 21, 2014 (SulTRAC 2014) to prepare Remedial Designs for each property that are consistent with the ROD and EPA's Remedial Design/Remedial Action (RD/RA) Handbook (EPA 1995). Remedial Designs for 120 Zone 3 properties (including 36 high-priority and 84 lower-priority properties) and Carrie Gosch Elementary School in Zone 1 are included with this document as Appendix A. High priority properties to be remediated in 2017 are highlighted in red on Figure 1-3, and lower priority properties are highlighted in blue. In addition, remedial designs for 19 previously remediated properties are included in Appendix A.

High priority properties are defined as (1) properties with children younger than 7 years old where lead concentrations in surface soils (0 to 6-inches) meet or exceed 400 mg/kg and/or arsenic concentrations in surface soils meet or exceed 26 mg/kg, or (2) commercial properties or residential properties without young children where concentrations in surface soils meet or exceed 1,200 mg/kg for lead and/or 68 mg/kg for arsenic. Lower-priority properties include residential properties without small children where lead concentrations exceed 400 mg/kg and/or arsenic concentrations exceed 26 mg/kg in any interval between 0 and 24 inches bgs. Lower priority properties also include commercial/industrial properties with lead concentrations between 800 mg/kg and 1,200 mg/kg or arsenic concentrations between 26 mg/kg and 68 mg/kg in any interval between 0 and 24 inches bgs.

Technical specifications for the remedial action are included with this document as Appendix B. Technical specifications to conduct the work described in this document were developed in consultation with the remediation oversight contractor and EPA with the intent to serve as a bid document for the remedial subcontractor. Roles and responsibilities as defined in the technical specifications reflect discussions with the remedial contractor regarding their planned procurement of this work. A table summarizing all analytical data and excavation volumes associated with each property is included as Appendix C. Property

Access Agreements are provided in Appendix D. The Engineer's Estimate of Cost is included as Appendix E.

2.1 PROPERTY IDENTIFICATION

Access agreements to conduct sampling (and remediation, if required) were obtained to the extent possible for each property within Zone 3. Under this work assignment, SulTRAC researched current property ownership through Lake County Assessor records. Individual properties and property boundaries were identified by geographic information system (GIS) files provided by the Office of the Lake County Assessor during September 2014. The tax assessor boundaries did not in most cases extend to the street curbs, so the boundaries shown on the designs were extended include the easement between the sidewalk and the street curb, and in some cases to the unpaved edges of the alley. Lateral boundaries of the properties shown on the designs were not modified. Attempts were made to gain access to all the properties through a "door-to-door" canvassing effort coupled with targeted mailings and public meetings. When properties were found to be vacant/abandoned or mailings were returned as undeliverable, SulTRAC attempted to identify alternate mailing addresses for property owners using Lake County Assessor records.

Pre-remedial design sampling was conducted at each property with a completed access agreement to identify soils that exceeded the RALs. Designs for each property indicate the area to be excavated and the depth of soil to be removed based on the results of sample analyses.

2.2 SAMPLING STRATEGY

Properties were sampled in accordance with the recommendations of the Superfund Lead-Contaminated Residential Sites Handbook (EPA 2003). For residential properties and vacant lots, five-point composite samples were collected from the front yard and the back yard. Separate samples were not collected from the side yard or the drip zone as part of the RD sampling. Commercial and industrial/pipeline properties were divided into four quadrants rather than halves. Sampling was only conducted in grassy areas or areas with exposed soil and/or gravel. Samples were not collected beneath paved areas or areas covered by structures. Up to five depth-discrete five-point composite samples were collected from each sampling area at six-inch depth intervals: 0 to 6 inches, 6 to 12 inches, 12 to 18 inches, 18 to 24 inches, and 24 to 30 inches bgs. The RI found that native sand was not contaminated by lead or arsenic at concentrations of concern (SulTRAC 2012a). Therefore, no sample was collected from the next deepest zone if native sand was encountered in at least three of five sampling locations. Samples were not collected from the 24 to 30-inch depth interval during the RI, but this interval was sampled where possible during the RD. During the course

of sampling, the soil lithology at each sampling point was recorded. Sample locations were photographed, and sampling locations and property features were drawn onto the sampling map by hand.

Sampling locations were spaced roughly equidistant within the sampling area, and were collected away from influences of the drip zones of structures. Samples were typically collected in an X-shaped pattern with one sample aliquot from each end point of the X and one sample aliquot from the center. Different patterns (such as a line) were used on an as-needed basis if the X-shaped pattern was not possible due to the layout of the specific properties and/or property features. Also, in some cases where the area of soil to be sampled was small (e.g. most of a quadrant was covered in concrete except for a small area of exposed soil) a three-point composite sample was collected. Samples were collected using hand augers, shovels, trowels, and/or spoons. The individual aliquots from each point were mixed together in a zip-lock type bag to create a depth specific composite sample.

Decontamination of sampling equipment was conducted after each composite sample was collected. Decontamination consisted of a dry scrub with a brush, a wet scrub with Alconox and tap water, and a rinse with tap water. Each sampling point was backfilled with the soil that had been removed from that point, and the grass was replaced on top (if applicable). Soil collected during the decontamination process, and decontamination water, were also placed in the sampling points to minimize investigation-derived waste (IDW).

During Phase I of the RI conducted in December 2009, the composite soil samples were first analyzed by XRF. The XRF screened results were split into three different categories: low (0 to 300 mg/kg), medium (300 to 600 mg/kg), and high (greater than 600 mg/kg). Soil samples were selected to represent each of these categories evenly, and 20% of the total samples collected were submitted to the EPA Contract Laboratory Program (CLP) laboratory for total metals analysis. During Phase II of the RI conducted in August 2010, XRF screening was not performed and all composite soil samples were submitted to CLP laboratories and analyzed for total metals and polycyclic aromatic hydrocarbons (PAHs).

Samples collected from June 2014 to June 2016 were field-screened with XRF to evaluate which samples should be sent to an analytical laboratory for analysis. If XRF screening concentrations for lead were between 300 mg/kg and 400 mg/kg and/or screening concentrations for arsenic were between 20 mg/kg and 30 mg/kg, samples were also sent to CLP laboratories for total lead and total arsenic analysis. Based on analytical results from the early samples sent for arsenic analysis, the range of arsenic concentrations that were submitted for laboratory analysis was expanded to between 20 and 50 mg/kg on July 9, 2015. In addition, composite samples with XRF screening concentrations of lead above 2,000 mg/kg and/or arsenic

above 100 mg/kg were submitted to an analytical laboratory for Toxicity Characteristic Leaching Procedure (TCLP) analysis for lead and arsenic.

The consultants for the Responsible Parties (RP), Parsons Corporation (Parsons), collected split samples for some of the samples collected by SulTRAC for the RD. Parsons collected samples from the same Ziploc-style bags containing composite samples collected by SulTRAC and analyzed by XRF. Parsons submitted additional samples for laboratory analysis at a private laboratory. The laboratory data provided for split samples collected by the RP through June 2016 was included in SulTRAC's data evaluation.

No sampling was conducted in July 2016. Beginning in August 2016, XRF analysis was discontinued and all composite soil samples were submitted to a laboratory for arsenic and lead analysis. Between August 2016 and October 10, 2016, all samples collected were sent to CLP laboratories. Beginning October 10 2016, soil samples were submitted to a private analytical laboratory (STAT Analysis Corporation [STAT]) to obtain more rapid sampling results. Parsons personnel joined SulTRAC field sampling crews on select properties and collected samples from the same Ziploc-style bags containing composite samples collected by SulTRAC between September 8, 2016 and November 21, 2016. Laboratory data from this sampling event has not yet been provided to SulTRAC and is not included in this RD.

The sampling plan noted that any soil samples with visible petroleum staining were to be submitted to a subcontract laboratory for TCLP VOCs, TCLP SVOCs, Ignitibility, and Corrosivity analysis. No petroleum staining was observed in any of the samples.

2.2.1 Residential/Vacant Lots

Residential properties with a structure (such as a house) on the property and vacant lots were divided into front and back yards. Sampling points were manually excavated until either a depth of 30 inches bgs was achieved, further sampling point excavation was not possible with hand tools due to refusal (e.g. roots, concrete slab, buried debris, etc.), or native sand was encountered.

2.2.2 Parks

Sampling in parks was conducted by dividing the park property into four quadrants of approximately equal areas. Each quadrant was sampled in the manner described above.

2.2.3 Commercial/Industrial Properties and Right-of Ways

Industrial/Commercial properties and right-of-ways were sampled by dividing the property into four quadrants of approximately equal areas. Properties with any dimension larger than a city block were further subdivided into parcels and each parcel was divided into quadrants, which were sampled in the same manner as described above for residential properties. For example, the NIPSCO pipeline right-of-way was divided

into five separate parcels and each parcel was divided into quadrants, for a total of 20 sampling locations in this right-of-way. Each quadrant was sampled in the same manner as described above.

2.2.4 Re-Sampled Properties

Twenty-two properties in Zone 3 which had been sampled between April 2014 and June 2016 were identified by SulTRAC or EPA as requiring additional data collection.

- Analysis of field notes and soil chemistry data collected identified five properties or portions of properties that were not adequately characterized by existing sampling, and additional sampling was performed to fully characterize these properties ([redacted]).
- The soil within zero to six inches bgs at six other properties ([redacted]) contained arsenic concentrations greater than the high priority criterion of 68 mg/kg as measured by XRF, and EPA directed SulTRAC to collect additional samples for laboratory analysis to limit the effects of this uncertainty.
- EPA FIELDS performed a statistical re-analysis of XRF and laboratory data, and produced a list of nine properties whose arsenic values were within a range of uncertainty. SulTRAC to re-sampled these nine properties ([redacted]) to confirm XRF results via laboratory analyses.
- The front yard of [redacted] was resampled to confirm XRF results which exceeded the RAL for arsenic with laboratory analyses.
- [redacted] was resampled to complete data characterization of the back yard and re-collect data from the front yard at the request of the property owner and with concurrence of EPA.

2.3 DATA EVALUATION

2.3.1 Data Validation

Laboratory analytical results from the CLP laboratory obtained during Phase I of the RI were validated by a SulTRAC chemist in accordance with the work plan. SulTRAC validated two sample delivery groups (SDGs) during Phase II of the RI, and the remaining SDGs were validated by EPA's Environmental Services Assist Team (ESAT). A SulTRAC chemist performed a project level validation on the SDGs which were validated by ESAT (SulTRAC 2012a).

Between April 2014 and June 2016, a portable XRF spectrometer was used to analyze soil samples at the USS Lead Site. XRF analyses were performed via three discreet measurements of lead and arsenic in each soil sample. A subset of the soil samples collected during this period were sent to a laboratory for lead and arsenic analysis. Statistical comparison of laboratory and XRF concentration measurements was performed by EPA FIELDS in August, 2016. This comparison determined that the maximum of the three discreet XRF concentration measurements was the most conservative to use for cleanup decision-making. In addition, it was determined that XRF analyses with a maximum lead concentration measurement between 325 and 400ppm should be adjusted to a "laboratory-equivalent" value of 400ppm. These values are indicated on the final designs with a "^" qualifier. Where both XRF and laboratory results for a depth interval of a property are available, the laboratory data was considered more representative of metals concentrations in soil (EPA, 2016).

Laboratory data packages obtained from 2014 through 2016 were verified internally by the laboratory for completeness and technical accuracy prior to submittal. ESAT conducted computer-aided data review and evaluation (CADRE) using the Electronic Data Exchange and Evaluation System (EXES) automated data assessment of analytical data generated by the CLP laboratories followed by a Level 3 review. Laboratory Data Consultants (LDC), a private chemical analysis validation firm, performed a Level 3 review of all analytical data generated by STAT and some data generated by CLP laboratories. Lastly, a SulTRAC chemist performed a project-level validation by reviewing laboratory case narratives, chains of custody, holding times, calibrations, performance criteria, and ESAT or LDC data validation reports for all CLP and non-CLP analytical data, and documented any analytical issues that may potentially have affected data quality.

2.3.2 RAL Comparison

The USS Lead ROD (EPA 2011b) established remedial action levels (RAL) of 400 milligrams per kilogram (mg/kg) for lead at residential properties, 800 mg/kg for lead at industrial/commercial properties, and 26 mg/kg for arsenic at both residential and industrial/commercial properties based on risk calculations performed during the RI. These risk calculations were estimated to be protective of human health and the environment (SulTRAC 2012a). Four types of data were used to identify which intervals of soil exceeded these criteria: XRF data, laboratory data from CLP laboratories, laboratory data from a private laboratory subcontracted by SulTRAC, and laboratory data provided by the RP laboratory.

The best available data, including XRF data, EPA laboratory data and RP laboratory data, is shown on the remedial designs included in Appendix A. The best available data was selected to compare to the RALs to determine whether each soil interval required removal as follows:

- For intervals where only XRF data was available, the highest of the three XRF values (adjusted in some cases to a laboratory equivalent value of 400 mg/kg, as described above) was compared to the RAL;
- For intervals where both XRF and laboratory analytical data was available, the laboratory data were compared to the RAL;
- For intervals where EPA and RP laboratory data and/or duplicate laboratory data were available, the highest of the laboratory values were compared to the RAL.

2.3.3 Number of Properties Requiring Remediation

Zone 3 contains 480 separate properties, including residences; residences and an adjacent lot under common ownership; vacant lots; commercial properties; parks; and railroad, NIPSCO, and other right-of-way (ROW) parcels. A remedial design for 19 Zone 3 high-priority residential properties where the lead concentrations in soils in the zero-to-six-inch interval exceeded 1,200 mg/kg or arsenic concentrations exceeded 68 mg/kg was previously submitted to EPA in September 2016 (SulTRAC 2016) while sampling was ongoing. When analytical results from this ongoing sampling became available, additional properties were identified that qualified as high priority based on lead and/or arsenic concentrations. In addition, some new properties were classified as high priority based on the presence of children and surficial soils that exceeded RALs. In total, another 19 high priority properties were identified. Remedial designs for these 19 properties were submitted electronically, and the properties were remediated in the same manner as described in the Final Remedial Design for High Priority Zone 3 Properties (SulTRAC 2016). These 19 additional properties have already been remediated but remedial designs have not been formally submitted in a document; they are included here only for formal documentation. This report includes designs for 121 properties, including 36 designs for properties where sampling results exceeded high priority criteria, and 85 other properties where sampling results exceeded RALs. Attempts to gain access to un-sampled properties are on-going in Zone 3. Designs for 92 properties in Zone 3 that have already been sampled but are not included in this document as well as any new properties that will be sampled later will be provided at a later date.

2.4 REMEDIAL DESIGN DOCUMENTS

This final RD document was preceded by a preliminary RD, a Draft RD, and a Draft-Final RD as described below.

2.4.1 Preliminary Remedial Design Document

A Preliminary Remedial Design document containing preliminary designs and other explanatory material was submitted to EPA and the RPs on May 15th, 2015 (SulTRAC 2015).

The preliminary designs displayed all data associated with the property, including the XRF measurements, EPA laboratory data, and RP laboratory data, as well as (1) notes from the sampling effort, (2) indication of whether soils are characterized as hazardous or nonhazardous, and (3) the need for a visual barrier at the base of the excavation as an institutional control.

Revised preliminary design drawings were provided separately to RPs in electronic format, and EPA, SulTRAC, the RPs, and the RPs' consultants reviewed the preliminary designs and the proposed remediation during a project meeting on November 4, 2015. The RP's consultant submitted additional comments on the preliminary designs via electronic mail on January 5th, 2016.

2.4.2 Draft Remedial Designs

A Draft RD report for remediation of 120 Zone 3 properties was submitted to EPA on February 2, 2017 (SulTRAC 2017a).

2.4.3 Draft-Final Remedial Designs

SulTRAC received review comments on the Draft RD report verbally and via electronic mail. In addition, EPA requested that SulTRAC prepare a remedial design for the Carrie Gosch Elementary School. A Draft-Final RD report for remediation of 120 Zone 3 properties and the Carrie Gosch Elementary School was submitted to EPA on March 3, 2017 (SulTRAC 2017b).

2.4.4 Final Remedial Designs

Final remedial designs for 120 Zone 3 properties and the Carrie Gosch Elementary School are included with this RD report as Appendix A. The property boundary data and parcel identification number shown on the preliminary designs were obtained from the Lake County, IN Assessor's site in GIS file format during September 2014. The tax assessor boundaries did not, in most cases, extend to the street curbs, so the boundaries shown on the designs were extended include the easement between the sidewalk and the street curb and, in some cases, the alley. Lateral boundaries of the properties shown on the designs were not modified.

Aerial imagery obtained from Digital Data Services in February 2013 is included on the designs. In some cases, the rooftops of nearby properties extend outside the GIS property boundaries shown on the designs due to the oblique angles of this aerial imagery. SulTRAC used LIDAR data to more accurately estimate the lateral boundaries of rooflines, and attempted to identify the presence of soil or paved areas in these "blind spots" with follow-up field visits. The excavation boundaries shown on the designs are believed to be accurate within the limitations of the mapping technique, but field verification of the designs is recommended.

The designs include excavation depths, classification of waste, the need for visual barriers, and other notes from the sampling and design effort. Quantities of material to be removed, backfill, sod, and visual barrier material shown on the designs were calculated using GIS and property boundary data. The excavation volumes for each property's front- and backyard were calculated using areas derived from the areal images and the excavation depths established from sampling analysis. Estimated manual excavation volumes beneath the drip zones of trees and estimated mechanical excavation volumes are included on the designs. SulTRAC assumed that an average of four inches of soil would be excavated manually within the drip zones of trees at each property. Additional manual excavation may be needed adjacent to the foundations of structures, concrete sidewalks or slabs, or areas which are inaccessible to excavation machinery. These additional manual excavation areas are not included in the excavated manual excavation volumes. Sampling results were used to estimate the volume of soils waste that exceed cleanup goals (type 1 waste) and soils that are expected to exceed TCLP criteria (type 2 waste).

3. PROJECT IMPLEMENTATION

Negotiations between EPA and the RPs have resolved that an RA contractor and subcontractor will execute the remedial designs and the RPs will implement the transportation and disposal (T&D) portion of this remedial action. The implementation strategy presented in this remedial design document specifies design requirements for the contractor and documents that the contractor and/or subcontractor must prepare. For example, a storm water pollution prevention plan (SWPPP) will be required for the work, and will be developed by the subcontractor. Technical specifications for the work are included in Appendix B.

3.1 PROJECT PLANS

The subcontractor shall submit a Remedial Action Work Plan (RAWP) for EPA approval along with all other plans listed below:

- The RAWP will include a detailed description of the remediation and construction activities detailing how the properties will be accessed, the soil removed and transported offsite for disposal, the backfill placed, and the properties restored. The document will describe measures to be taken to protect property owners and/or residents of the properties being remediated and adjacent properties, protect structures and other property features (e.g., sidewalks, fences, trees, etc.) and the protection of above ground and below ground utilities. In addition, the RAWP shall include the following:

- Procedures to document pre- and post-remediation conditions and compliance with any agreements with property owners. The discussion will provide detailed guidance to the project team to implement quality control processes and procedures during remediation, including specific verification and acceptance procedures.

- Procedures for utility notification of upcoming excavation activity, and verification that utilities have been located prior to beginning excavation.

- Procedures for developing a Restoration Plan for each property;

- A schedule of deliverables;

- A proposed Remedial Action Construction Schedule in Gantt chart format;

- Actions to be taken to satisfy applicable permitting requirements;

- Methods that will be used to prevent mobilization of contaminants and expose residents, other community members, and site workers to site-related contaminants at concentrations above acceptable regulatory limits (e.g. dust suppression, track-out prevention, etc.).

- A Traffic Management Plan (TMP): Remedial activities will involve a large number of construction vehicles and trucks hauling materials to and from the site through a residential community with schools, homes, parks, and day care centers. The TMP will address delivery of construction equipment and supplies; transportation and disposal of excavated soils from the remediated properties; transportation of backfill and topsoil materials, and transportation of landscaping materials. The subcontractor will describe how they will manage vehicle traffic in Zone 3 and surrounding area, and will specify a procedure identifying how community concerns and complaints will be addressed. Signs in some areas indicate that no trucks are allowed, suggesting that special arrangements with the city of East Chicago will be required.

- Procedures for Waste Handling and Disposal: The RAWP will include a section describing how wastes will be managed and disposed of.

    - Large quantities of backfill and waste (including a significant proportion of waste characterized as hazardous) will require transportation to and from properties and a temporary waste transfer facility (the DuPont facility at 5215 Kennedy Ave) while remediating properties for this project. The procedures will identify and

summarize requirements of applicable regulations and local ordinances; will identify the intended temporary waste transfer facility including name, address, and EPA identification numbers and current license information; and will identify proposed procedures to manage wastes (including detailed descriptions of any stockpiling or temporary storage of waste), manage transportation (including traffic control procedures), prepare waste manifests, and document proper disposal of all wastes generated. The procedures will detail how the subcontractor intends to manage wastes and document waste management from when the when the wastes are generated until they are offloaded at the temporary waste transfer facility.

- Procedures for handling and disposing of trees, shrubs, and vegetation removed as part of the remediation activities will be discussed in the Waste Handling and Disposal section of the RAWP.

- Sampling and Analysis Plan (SAP): The SAP will detail procedures to collect and analyze samples including backfill and topsoil quality samples and waste disposal samples and details about any testing to be conducted as part of the project, including compaction testing. The SAP will discuss: (1) sample frequency requirements, (2) sampling methods, (3) appropriate regulatory limits, (4) laboratory analytical methods, list of compounds to be analyzed for, and corresponding required detection limits, (5) quality assurance and quality control procedures, (6) sample numbering, handling, and shipping procedures, (7) field equipment calibration, and (8) reporting procedures.
    - For remediation of Zone 3 properties, the contractor will perform construction quality assurance and air monitoring activities.

- Site-Specific Health and Safety Plan (HASP): The HASP will outline procedures to be followed to ensure that the work is completed safely and with no adverse health effects to subcontractors' employees and the community.

- Emergency Response Plan (ERP): The ERP must describe procedures to be used in the event of an accident or emergency at the Site (for example: utility damage, slope failure, etc.). The ERP must include:
    - Name of the person or entity responsible for responding in the event of an emergency incident;

- Plan and date(s) for meeting(s) with the local community, including local, State, and federal agencies involved in the cleanup, as well as local emergency squads and hospitals;

- Spill Prevention, Control, and Countermeasures (SPCC) Plan (if applicable), consistent with the regulations under 40 C.F.R. Part 112, describing measures to prevent, and contingency plans for, spills and discharges;

- Notification activities in accordance with ¶ 4.4(b) (Release Reporting) in the event of a release of hazardous substances requiring reporting under Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004.

- Environmental Protection Plan (EPP): The EPP will identify proposed procedures to protect the environment during the remedial activities. The EPP will identify and summarize requirements of applicable regulations and local ordinances, and will include dust suppression procedures; procedures to avoid spilling or tracking contaminated soils on sidewalks and roadways; spill control and response; equipment decontamination; storm water control; and plans and procedures to comply with applicable local ordinances.

    - A Construction Stormwater Pollution Prevention Plan (SWPPP);

        - Activities and procedures the subcontractor will implement to control stormwater runoff during excavation and restoration of properties and at staging/storage, or laydown areas, and will incorporate the use of best management practices (BMPs) for earth-disturbing activities and describe procedures to control potential spills. The subcontractor will implement procedures during remediation activities to prevent or reduce pollutants in stormwater discharges. Stormwater, erosion, and sediment control BMPs will be outlined in a SWPPP designed to reduce stormwater pollution potential from the site. The plan will be modified as necessary during the RA to reflect current site conditions and practices, as required by 327 IAC 15-5, Rule 5.

        - The SWPPP will be submitted to the City of East Chicago for review and approval prior to initiation of excavation activities.

- The subcontractor will comply with the provisions of the East Chicago Municipal Code, Title 16 of the Environmental Protection Code (§16.05.180 Fugitive Particulate Matter) and other applicable provisions (for example, Noise Regulation, §16.05.390).

The contractor shall submit a SAP for EPA approval in accordance with technical specification 31 23 00 Part 3.3:

- The SAP shall specify the type of air monitoring equipment to be used, equipment calibration procedures, equipment operation procedures including proper location, and samples to be collected.
- The SAP will document appropriate regulatory limits, laboratory analytical methods and detection limits, quality assurance and quality control procedures, sample tracking, sample handling and shipping procedures, and reporting procedures.

3.2 PRE-REMEDIATION ACTIVITIES

The following subsections describe the primary components of the pre-remediation activities associated with USS Lead OU1 remediation. This section identifies several considerations of which bidders should be made aware.

3.2.1 Pre-Remediation Activities

The property owner access agreements between EPA and the property owners that allow sampling also typically grant access for RA activities. A separate access agreement for the RA is therefore not necessary unless the property owner only granted access for sampling activity, or property ownership has changed between the RD sampling event and the RA fieldwork. The contractor will be responsible for verifying current property ownership through Lake County Assessor records or other means as appropriate, and that an access agreement for remedial activities is in place. The contractor shall complete a new access agreement with the current property owner as needed. Available access agreements for the 121 properties described in this remedial design document are included as Appendix D.

The subcontractor and contractor shall conduct a meeting with each property owner (including residents or tenants as appropriate) at the property to be remediated and complete a restoration agreement. If the property owner is unable or unwilling to meet at the property (e.g. owner lives out of state), the owner may designate a representative to complete the agreement or it may be completed via mail or email. The subcontractor shall document the pre-existing condition of each property or area used for access to the remediation property (including the existing grade of the property, current drainage pathways, and the condition of building foundations, sidewalks, trees, landscaping, etc.) with photos and/or video to ensure

that the areas are restored to the pre-existing condition or better. In addition, the subcontractor shall identify homeowner's property or articles (such as fences, dog houses, trampolines, etc.) that will need to be moved to facilitate excavation activities. The contractor shall make provisions to secure storage of above-referenced property during excavation activities. Upon completion of excavation activities, the subcontractor shall facilitate the return of said homeowner's property to the property.

3.2.1.1 Pre-Remediation Survey

Prior to excavation at each property, a pre-remediation survey of the area to be remediated will be conducted by a professional land surveyor licensed in the State of Indiana, or alternate equivalent method as approved by EPA. The pre-remediation survey shall define the existing topography, including any existing depressions or drainage slopes toward structures, before remedial activities begin with sufficient accuracy to resolve any disputes about drainage that may arise after completion of the work.

3.2.2 Access for Property Owners/Residents

During remediation activities, each home and garage will remain accessible to the home owners/residents at all times. Two points of access need to be maintained for residents. If two points of access are not possible, the subcontractor will discuss with the property owner and make appropriate changes to provide proper access for the owner or resident. A visual barrier, such as high-visibility orange construction fencing material, will be installed around each open excavation area to prevent accidental entry into the work site. The high visibility barrier may be reused at multiple properties to the extent practicable.

Appropriate measures will be taken to ensure that the residents will not have to walk over exposed soil prior to entering their home. Sidewalks will be swept or washed off during and/or after each workday to provide as clean an entryway as practicable. If there is no sidewalk, a clean pathway will be provided by laying down plywood or other means to prevent exposure and tracking of soils and mud. All residents (especially children) will be asked to stay away from the remediation area, which will be marked with construction fencing. Special considerations such as access for elderly or disabled residents/owners will be addressed as applicable.

3.2.3 Site Security

The USS Lead site is situated in an economically distressed area, where security and theft may be problematical. The subcontractor shall provide site security as needed including temporary fencing and security guard patrols of the active excavation areas. In addition, the subcontractor shall secure temporary storage for excavation equipment and homeowner's property that needs to be relocated to facilitate excavation activities. The subcontractor shall coordinate with the City of East Chicago including their police department to increase security patrols overnight and on weekends and holidays.

3.2.4 Logistics

The subcontractor will be responsible for coordination with residents, owners, and other stakeholders (including the City of East Chicago) to locate areas which could be used by subcontractors for storage of construction equipment, construction trailers, storage boxes, and materials. SulTRAC understands that storage of equipment or materials onsite may not be allowed by the City of East Chicago, thus daily mobilization of equipment and materials to an offsite staging area may be required. The contaminated soils and backfill will not be stockpiled at the work sites (individual properties) within Zone 3.

3.3 REMEDIAL ACTIVITIES

The following sections describe remedial activities that will be followed at each property

3.3.1 Excavation

Public access to the sites will be controlled during remediation to prevent exposure of residents and property owners to contaminated soil and open excavations. Access will be controlled by installing orange construction fencing and/or warning tapes around work areas. The subcontractor will be responsible for site security during working and nonworking hours as indicated in Section 3.2.3 above.

Where trees or shrubs are present in the area to be remediated and will remain in place in accordance with the property restoration agreement, soils within the drip zone of the tree or shrub shall be excavated manually in accordance with the technical specifications (31 23 00 Part 3.2 Excavation Beneath the Drip Zone of Trees). Trees with diameters of four inches or greater at chest height will remain in place unless otherwise agreed to, and soil in the root zones of these trees will be manually excavated to remove as much soil as practicable without damaging the roots of the trees (two inches at minimum).

The soil designated for excavation outside the building and pavement footprints is based on the analytical results from the RD sampling. Most soil exceeding remediation goals requiring removal is within the upper six to 12 inches, but at some locations, it extends deeper than 24 inches bgs. If soil exceeding remediation goals is present below 24 inches, a high-visibility barrier (e.g., orange construction fence) shall be placed at a depth of 24 inches after excavation has been completed and prior to the start of backfill placement as an indication that contaminated material is present below this depth. Additionally, where trees and/or shrubs are present in the excavated area and the full depth of excavation was not achieved due to the presence of roots, high visibility fencing shall be installed at the bottom of the excavation prior to backfill installation to indicate that contaminated material may be present below this depth. High visibility fencing will not be installed in areas where the excavation is less than 6 inches deep. Soil beneath the footprint of residential buildings, garages, and engineered barriers such as sidewalks, driveways, permanent pools, and patios will not be excavated as part of the RA. As noted in Section 3.1, the contractor will perform air monitoring and

will notify the subcontractor anytime that dust suppression is required based on air monitoring results. The subcontractor should be pro-active in applying dust suppression when visible dust is noted, as well as cleaning any track-out or spilled materials from the roadways. The selection of roads used for transport of materials and equipment will be coordinated with the City of East Chicago.

If the deepest sample interval at a particular yard or quadrant is less than 24-inches due to refusal, and no deeper sample is available to evaluate soil quality in the interval between the deepest sample and 24-inches below grade, the subcontractor shall excavate to the depth shown on the design, and will evaluate the cause of refusal. Refusal may be caused by an engineered barrier, a rubble zone, or other features. In some cases, it may be appropriate to characterize and remediate soils beneath the zone that caused refusal to hand sampling tools. On a case-by-case basis, the contractor will meet with EPA to determine an appropriate course of action to address soils beneath zones of refusal. If appropriate, EPA shall require the contractor to develop a means of evaluating soils in the zone that could not be accessed by hand sampling tools, and remediate these soils.

Excavated soils will be loaded into trucks and the area beneath and adjacent to the trucks will be covered with plastic sheeting to collect soil spillage. The plastic sheeting will be replaced as needed (i.e. when damaged) and removed at the end of each work day and appropriately disposed of. The street will be swept as needed to remove visible soil and debris. The City of East Chicago and its police department will be notified when soil excavation and loading will be scheduled in each street or alley.

The estimated quantities of soil to be excavated from the new designs for 121 properties included in this document are indicated in Table 1. As noted above, quantities of soil to be removed indicated on Table 1 include soils that will be left in place around the root balls of large trees and shrubs or to maintain the structural stability of building foundations, sidewalks, streets, and driveways. Therefore, these quantities should be considered upper bounds of the quantities of soil that will actually be excavated and removed from each property. Additional confirmation soil sample collection and analysis will not be required during the RA.

At the completion of each work day during excavation activities, the subcontractor will flush an external hose bib (or basement utility sink if there is no external hose bib near the service line) for 15 minutes.

Real-time air monitoring and laboratory analysis of air samples will be conducted at each property during remediation by the contractor. If dust action levels as defined in project-specific plans are exceeded, work shall be stopped until dust abatement measures such as application of water are implemented. Acceptable dust abatement is no visible dust in the air and compliance with 326 IAC Article 6, Title 16 of the Environmental Protection Code (§16.05.180 Fugitive Particulate Matter).

3.3.1.1 Excavation Beneath Decks, Non-Permanent Structures, and Wheelchair Ramps

Decks, non-permanent structures, and wheelchair ramps shall be moved prior to excavation to access the underlying soil for remediation. Non-permanent structures include, but are not limited to, inflatable swimming pools, playsets, trailers, and portable storage sheds. Decks and wheelchair ramps will be considered non-permanent unless EPA determines otherwise on a case-by-case basis. If a child could not reasonably access the area beneath a non-permanent structure, and the property owner and EPA agree to leave it in place, the non-permanent structure and underlying soil may remain undisturbed on a case-by-case basis.

All items temporarily relocated for remediation shall be restored to pre-existing condition in accordance with the property restoration agreement at the conclusion of remedial activities.

3.3.1.2 Post-Excavation Survey

Following excavation, a post-excavation survey of the vertical and lateral limits of the open excavation will be conducted by a professional land surveyor licensed in the State of Indiana, or alternate equivalent method as approved by EPA. The survey shall document that the actual excavation accurately matches the dimensions of the excavation required by the remedial design drawing.

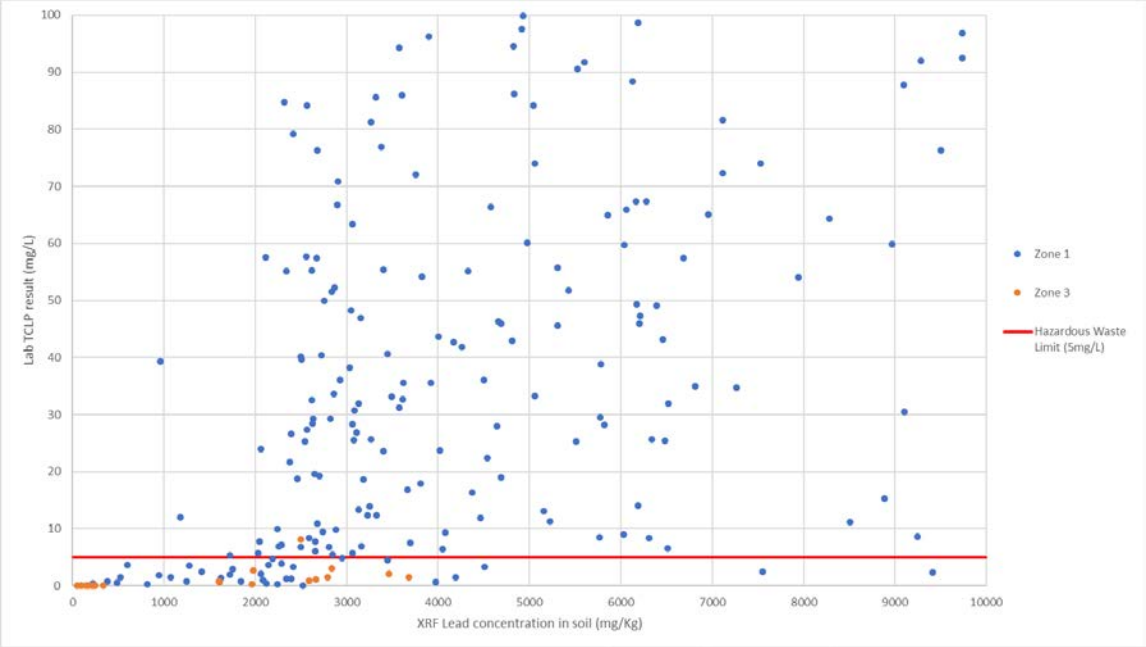
3.3.2 Transportation and Disposal (T&D)

EPA has reached an agreement with the RPs that a contractor and subcontractor will excavate contaminated soils, transport them to a DuPont facility at 5215 Kennedy Ave, East Chicago, Indiana, and offload them. T&D of contaminated soils after offloading at the DuPont facility will be the responsibility of the RPs. Offloading soils and subsequent T&D will be performed in accordance with the Temporary Storage, Transportation and Disposal Plan (Parsons, 2016).

All trucks transporting excavated soils destined for transport to the DuPont facility will be properly covered or enclosed. Dust abatement measures will be implemented during transportation operations. A street sweeper and/or water truck will be used to keep the roads/streets clean and free of dust as necessary. Provisions for equipment decontamination and regular street/alley cleaning to minimize contamination and spread of airborne particulates and maintain a clean work area will be described in the EPP.

Based on soil sampling during the RI and RD, metals-contaminated soil destined for disposal is assumed to be a combination of hazardous and special waste. Samples from properties sampled prior to August 2016 were sent for TCLP analysis to assess appropriate treatment as hazardous based on XRF screening. However, no TCLP results are available for properties sampled in August 2016 and afterwards because XRF screening was discontinued. TCLP results are available from 287 samples in Zones 1 and 3. Arsenic concentrations in these samples ranged up to 2,180 mg/kg, and TCLP results for those samples did not

exceed the TCLP criterion of 5 mg/L for characteristic hazardous waste. Lead concentrations in these samples ranged up to 82,900 mg/kg (about 3,800 mg/kg average), and TCLP results for those samples exceeded the TCLP criterion of 5 mg/L for characteristic hazardous waste in 96 samples. Evaluation of the TCLP results based on lead concentration suggests that soil containing more than about 2,000 mg/kg lead could be characterized as hazardous based on toxicity characteristics. A plot of the available lead concentrations up to 10,000 mg/kg and associated TCLP results is included for reference below.



Lead Concentration vs. TCLP Concentration as Measured in Zones 1 and 3

Table 1 indicates estimated soil volumes that require transportation offsite for disposal. Actual weight of excavated soil will be tabulated during the RA using weight tickets from disposal facilities. The subcontractor will keep records of all soil transported to the temporary staging area from each property on a daily basis. The DuPont facility at 5215 Kennedy Ave. will be used as a temporary staging area for hazardous and non-hazardous soils and materials excavated and transported from Zone 3. The subcontractor will comply with both substantive and administrative requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 et seq.).

Appropriate traffic measures and signage will be used at the equipment storage areas and the residential properties in accordance with Section 800 of the Indiana Department of Transportation Standard Specifications, where applicable. If needed, the subcontractor will coordinate with the City of East Chicago to install temporary “no parking” signs in areas where work is being performed to ensure access to properties.

3.3.3 Backfill and Grading

The subcontractor will identify a source or sources of clean backfill material and clean topsoil. The sources will not be approved by EPA for use as backfill or topsoil until soil samples from the source area have been collected and analyzed, and analytical testing results indicate that the backfill material meets the requirements of the specifications for clean fill materials. Backfill and topsoil requirements are detailed in the technical specifications (Section 31 23 00).

The property will be backfilled and sodded no more than five days after the start of excavation (weather and schedule permitting due to lead service line replacement coordination with City and State departments). Backfill will be placed in lifts with a maximum compacted thickness of six-inches, up to four to six inches below finished grade (depending on depth of topsoil to be installed). Backfill will be compacted to the limits specified in the technical specifications. Experienced geotechnical professionals will ensure that backfilling requirements have been met through in-place field density testing. The top four to six inches of the excavation will be backfilled with clean, imported topsoil to restore the area to meet the preexisting topography and accept sod in accordance with the restoration agreement signed by the property owner. Topsoil will be placed in accordance with requirements of the specifications.

The backfilled areas will be graded to restore pre-excavation grades and also to meet adjacent grades. If agreed to by EPA and the property owner, post-restoration topography may be modified as necessary to facilitate proper storm water runoff. Excavations will be backfilled as soon as practicable in order to minimize the time the excavated areas are left open. Excavations will not be left open more than two days (weather and schedule permitting due to lead service line replacement coordination with City and State departments). The excavated areas will be backfilled with clean materials that met the requirements outlined in Table 2 to restore pre-excavation grades.

The delivery trucks traveling between the borrow sources and the excavated property will follow a direct route using major roadways and avoiding neighborhood streets to the extent practicable. The haul trucks hauling backfill or topsoil will be covered with a secured tarp or other device. Any materials spilled during transport will be removed and cleaned up as soon as practicable. Backfill and topsoil material delivery tickets will be submitted to the subcontractor. The subcontractor will keep records of quantities of all materials delivered.

Dust abatement measures will be applied to paved and unpaved roads used by the subcontractor to transport borrow materials to the properties being remediated. Acceptable performance for dust abatement is no visible dust in the air and compliance with 326 IAC Article 6 Particulate Rules. Work may be stopped until dust abatement measures are implemented.

At the completion of each work day during backfill/topsoil placement activities, the subcontractor will flush an external hose bib (or basement utility sink if there is no external hose bib near the service line) for 15 minutes.

3.3.3.1 Backfill and Topsoil Quality Requirements

All imported backfill soil and topsoil will be certified to meet backfill quality requirements described in herein before placement. All imported fill will undergo analytical geotechnical and chemical testing to demonstrate its compliance with the project specifications. Backfill and topsoil requirements are detailed in the technical specifications section 31 23 00, Appendix B. Table 2 identifies specific compounds and RSLs or associated other criteria for backfill and topsoil. Backfill and topsoil sources will be sampled and analyzed at a frequency of one sample per 1,000 cubic yards (CY) delivered and from each new borrow source as described in the technical specifications section 31 23 00 Part 2. Concentrations and analytical detection limits for each compound in backfill and topsoil must not exceed numerical criteria listed on Table 2. EPA will review and approve analytical and test results for the backfill and topsoil samples before the material will be approved for delivery to the site.

Backfill and topsoil sources will be located by the subcontractor and will be specified in the EPP. Backfill and topsoil will be considered acceptable if it meets the following characteristics:

- Contains less than 56.6 mg/kg average lead concentration (56.6 mg/kg is the background threshold value [BTV] for 6- to 12-inch soils [SulTRAC 2012]).
- Contains less than 14.1 mg/kg average arsenic concentration (14.1 mg/kg is the site-specific background concentration for arsenic [EPA 2012]).
- Contains no contaminants at concentrations greater than the limits specified in the Construction Specification 31 23 00 (these numerical criteria are also listed in Table 2).
- Contains insignificant amounts of debris (tree roots, rocks, etc.).
- Meets all other requirements of Construction Specification 31 23 00
- Topsoil from off-site sources must meet the requirements of Construction Specification 31 23 00 and must be capable of sustaining growth of grass, sod and sustain vegetable gardens.

3.3.3.2 Placement of Backfill Material

The compacted, in-place volume of backfill material has been estimated for each property and is indicated on each property design drawing. The borrow source materials must meet the requirements of the specifications and be approved by EPA before the backfill can be transported to the site. The subcontractor will spread backfill material in lifts with a maximum compacted thickness of six-inches, and compact it in accordance with the requirements of the specifications. Some hand work using wheelbarrows and shovels may be necessary to backfill areas with difficult and/or limited access.

Compaction of the backfill soil will be done on each layer as required to prevent settlement. After each individual lift is installed, the backfill material placed will be compacted using a plate compactor, roller, hand tamping, or other suitable means. Dust abatement measures will be applied during backfilling operations as may be required.

3.3.3.3 Post-Backfill Survey

Following backfill placement, a post-backfill survey will be conducted by a professional land surveyor licensed in the State of Indiana, or alternate equivalent method as approved by EPA, to document the amount of backfill placed.

3.3.3.4 Placement of Topsoil

The volume of compacted, in-place volume of topsoil has been estimated for each property and is indicated on each property drawing. The topsoil borrow source materials must meet the requirements of the specifications before the topsoil can be transported to the site. Transportation operations will employ dust abatement.

The subcontractor will transport the clean topsoil from the approved source, place it in a uniform lift with a compacted thickness of four or six-inches, compact it in accordance with the requirements of the specifications, rake the upper one-to-two inches of soil, and make ready to accept sod or seed as may be required.

Any additional nutrients which may be required to support proper establishment of sod will be added in accordance with the requirements of the specifications, and worked into the topsoil prior to installation of sod or seed.

3.3.3.5 Post-Topsoil Survey

Following topsoil placement, a post-topsoil survey will be conducted by a professional land surveyor licensed in the State of Indiana, or alternate equivalent method as approved by EPA. The survey shall document the amount of topsoil placed and that surface elevations have been restored to the pre-existing condition (unless post-restoration topography was modified as previously discussed to enhance stormwater drainage).

3.4 RESTORATION OF PROPERTIES

Properties will be restored as closely as possible to the condition that existed before remediation. The ground surfaces will be properly sloped to restore the original grade and runoff pathways that existed prior to remediation activities, or to improve preexisting drainage as agreed to by property owner and EPA. Any

property features damaged by remediation activities, including structures, foliage, pavement, fences, outbuildings, ramps, patios, driveways, walkways, and other features will be restored to pre-remedial conditions or the property owner will be offered a suitable replacement.

3.4.1 Restoration and Reinstallation of Fences and Other Items

The fences and fence gates which were removed and stored to facilitate access to the property for remediation will be reinstalled to pre-remediation condition. Any section of fence or fence post which was damaged during removal will be repaired to the satisfaction of the property owner or replaced by the subcontractor.

All other items such as bird feeders, swing sets, and other structures or site features which were removed to facilitate the soil excavation will be reinstalled in their pre-remediation condition at their original locations. Any private utilities such as underground sprinklers and underground electrical feed to garages or other structures which were removed or damaged during remediation work will be reinstalled or repaired as may be required, providing that these utilities were installed legally and the installation was code compliant. Any private utilities which were illegal or not code compliant will not be reinstalled.

3.4.2 Replacement and/or Repairs of Walkways and Driveways

Damage to sidewalks, curbs and gutters, steps, and driveways resulting from the RA activities will be repaired to pre-remedial condition by the subcontractor. In addition, any other damages to the property will be repaired by the remediation subcontractor at no additional cost to EPA.

3.4.3 Restoration of Lawns and Other Landscape Features

All backfilled areas and areas disturbed by soil removal operations will be uniformly graded to the pre-excavation grades to +/-0.10 feet, except as necessary to permit proper storm water runoff, or as agreed to by EPA and the property owner. Following placement, the topsoil will be aerated using hand tools (or similar low ground-pressure mechanical method) for acceptance of soil amendments and fertilizer, and lime as necessary, after which the topsoil will be rolled and prepared for installation of sod or seed by scarifying the upper one-to-two inches with a rake. During summer months the topsoil will be moistened prior to installation of sod. Sod will be installed in accordance specification 32 92 23; seed (if used, e.g. for restoration of ROWs or disturbed access area) will be applied in accordance with specification 32 92 19.

Landscaping at each property will depend upon the conditions documented during the pre-restoration meeting with the property owner on the Restoration Agreement supplemented by photographs and/or video records. At a minimum, restoration will include installation of sod or seed and planting new trees and shrubs to replace trees and shrubs which were removed and/or damaged during the remediation activities.

Upon property owner request and in consultation with EPA, if the property owner prefers to reinstall landscaping products themselves, a voucher for landscaping products, such as trees, shrubs, flowers, and vegetable plants may be provided in lieu of replacement in kind of preexisting plants. The voucher can only be used at the designated nursery. The voucher must be good for a period of at least one year in the event that the optimal planting season has passed and the property owner will replace the vegetation in the following year. Unless the homeowner elects to perform his/her own landscaping restoration, the subcontractor will restore landscaped areas to pre-remedial conditions as part of property restoration. This will include replacement of bushes, shrubs, trees, flowers, and similar plantings removed during the soil removal. If, however, the homeowner accepts the issued voucher, the homeowner will have sole responsibility for landscaping restoration of the affected landscaped area. In this case, the subcontractor will be responsible for the establishment of other plantings (if applicable), sodded, and seeded areas only.

3.4.4 Maintenance Period

Landscaping will be maintained by the subcontractor in accordance with the specifications 32 92 23 and 32 92 19. The subcontractor will water the sod and replacement shrubs and trees for a minimum four-week maintenance period following planting to facilitate establishment of replacement vegetation. For properties that are occupied, the Subcontractor must water using the owners' potable water supply, and reimburse the property owner for full monthly water utility charges. Vegetation installed during June and July will have a two-month maintenance period. Property owners/tenants will be provided with instructions for proper care of the turf after the maintenance period. Trees and shrubs will be under warranty for one year from the date of acceptance of work; if the vegetation is not healthy it will be replaced by the subcontractor.

Upon successful completion of the maintenance period, the contractor will provide a certification that Contract Documents have been reviewed, work has been inspected, and all the work is completed in accordance with Contract Documents.

3.4.5 Cleaning

After completion of all earth work and installation of sod or seed, the property's walkways, driveways, and other surfaces will be swept clean. Street cleaning or other effective measures will be conducted on a regular basis and as required to keep soil from entering the storm water collection system. All equipment, tools, and access materials will be removed. The subcontractor will remove temporary erosion control measures either during or after the maintenance period has been completed.

3.5 POST-REMEDIATION REVIEW

After completion of work, a post-remediation review meeting will be conducted with the contractor, the subcontractor, and the property owner at each remediated property.

3.5.1 Pre-final Inspection of Completed Work

After completion of excavation, backfill, and restoration of each property, the contractor and subcontractor will meet with the property owner to review the restoration agreement, inspect the work completed, and if applicable, prepare a "punch list" of deficiencies and other action items needed to complete work at each property. After receipt of the punch list, the subcontractor will correct all identified deficiencies within one week.

3.5.2 Final Inspection and Property-Specific Documentation

After all punch list items have been addressed, the subcontractor will meet with the property owner and contractor (and EPA, at EPA discretion) at each remediated property. During the final inspection meeting, the acceptability of the completed work including punch list items will be documented based on a review of the restoration agreement, remediation drawings, the punch list, and pre-remediation photographs. The subcontractor will obtain post-remediation photographs and/or videos during the meeting to document completed work. If the property owner is not satisfied with the work, the subcontractor will amend the punch list as necessary to address property owners' concerns, complete amended punch list tasks within 1 week of the post-remediation meeting, and schedule a follow-up meeting to obtain owner concurrence that the agreed to work has been completed. A letter confirming that the property has been remediated, along with pertinent supporting documentation, will be provided in a format approved by EPA by the contractor to the owner after conclusion of the restoration.

3.5.3 As-Built Drawings

Within two weeks of completion of restoration of a property (as documented by a restoration completion agreement signed by the property owner), the contractor will provide to EPA an as-built drawing documenting the work completed at the property. As-built drawings will be final property designs with red-line amendments showing any differences from the final design in .pdf format. As-built drawings will include a note stating: "Property excavated and restored as shown on design except as modified by red-line." Each as-built drawing will include a header denoting whether it is a draft or final drawing and a date. EPA may require modification to the as-built drawing to more accurately reflect the work completed at a property.

3.5.4 Remedial Action Report

The contractor will prepare a Remedial Action Report at the end of construction and restoration activities at remediated properties in Zone 3. The Remedial Action Report will contain the following:

1.0 INTRODUCTION
- 1.1 Site Description
- 1.2 Historical Operations
- 1.3 Investigations and Studies
- 1.4 Description of Selected Remedy
- 1.5 Remedial Action Objectives
- 1.6 Previous Removal and Remedial Activities

2.0 CONSTRUCTION ACTIVITIES
- 2.1 Construction Sequence
- 2.2 Pre-Construction Activities
- 2.3 Excavation and Disposal
- 2.4 Site Restoration
- 2.5 Operation and Maintenance
- 2.6 Community Relations

3.0 REMEDIATION SUMMARY
- 3.1 Summary of Remediated Properties
- 3.2 Summary of Removed Soil
- 3.3 Documentation
- 3.4 Property Summary Tables
- 3.5 Remediation Agreements
- 3.6 Remediation Completion Agreements
- 3.7 As-Built Drawings
- 3.8 Waste Manifests
- 3.9 Backfill Sampling Results Summary Table and Laboratory Reports
- 3.10 Property Owner Satisfaction Surveys

4.0 FUTURE ACTIVITIES
- 4.1 Properties with Contamination Left in Place
- 4.2 Properties where Remediation was Not Completed
- 4.3 Properties with Changed Conditions
- 4.4 Properties with Ownership Changes

4.5 Recommendations for Future Work

3.6 WARRANTEE PERIOD

The subcontractor will warrantee trees and shrubs for a period of one year from the time of construction and will replace defective trees and shrubs, as necessary, if identified within the warranty period.

3.7 DATABASE MAINTENANCE

The subcontractor will develop a database to maintain a record of analytical data, photographic data, and other data associated with the excavation and restoration of properties in conjunction with a GIS system. In addition to the database/GIS system, a web-based project management tool may be used to manage property information throughout the remedial design and excavation process. At the conclusion of the project, all data including data archived electronically in a database such as pre- and post-restoration photos, as built drawings, property owner satisfaction surveys, letters reporting analytical results and completion of remedial work, and the like, will be provided in an electronic format to EPA.

3.8 FINAL DEMOBILIZATION

After all work is completed the subcontractor will demobilize all equipment and all temporary facilities. Final demobilization comprises removing the remediation subcontractor's temporary facilities, including utilities, staging, storage or laydown areas, equipment, equipment decontamination facilities, temporary erosion and sediment control features, sanitary facilities, and the like. All subcontractor-occupied areas will be restored to their original condition.

4. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Table 3 lists statutes and regulations deemed to be Applicable or Relevant and Appropriate Requirements (ARARs) at the site (SulTRAC 2012). It is organized by the three types of ARARs: location-specific, action-specific, and chemical-specific. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(e), response actions are exempt from environmental permits and need not comply with the administrative requirements of applicable or relevant and appropriate environmental laws and regulations, such as any notification, approval and reporting requirements of these laws and regulations. However, substantive requirements must be met.

5. REFERENCES

EPA 1992. "Community Relations in Superfund—A Handbook," Office of Emergency and Remedial Response, OSWER Directive No. 9230.0-3 C. January.

EPA 1994. "National Oil and Hazardous Substances Pollution Contingency Plan, Revised." 40 CFR Parts 9 and 300. September.

EPA 1995. "Remedial Design/Remedial Action (RD/RA) Handbook," Office of Solid Waste and Emergency Response (OSWER), 9355.0-04B, EPA 540/R-95/059. June.

EPA 2003. Superfund Lead-Contaminated Residential Sites Handbook. OSWER 9285.7-50. August.

EPA 2008. Hazardous Ranking System Documentation Record. US Smelter and Lead Refinery. April.

EPA 2009a. "RAC II Region 5 Statement of Work for Remedial Investigation/Feasibility Study (RI/FS), USS Lead Superfund Site, Lake County, Indiana. June 19.

EPA 2009b. ALM Spreadsheet (MS Excel). June 21. On-Line Address: http://www.epa.gov/superfund/lead/products/ALM_2009.xls

EPA 2011a. "Community Involvement Plan, USS Lead Superfund Site, East Chicago, Indiana." U.S. Environmental Protection Agency, Region 5. April.

EPA 2011b. "Pollution/Situation Report, USS LEAD -2, Removal Polrep, Initial Removal Polrep" U.S. Environmental Protection Agency, Region 5. November 1.

EPA 2011c. "Pollution/Situation Report, USS LEAD -2, Removal Polrep" U.S. Environmental Protection Agency, Region 5. November 16.

EPA 2011d. "Pollution/Situation Report, USS LEAD -2, Removal Polrep" U.S. Environmental Protection Agency, Region 5. December 15.

EPA 2012a. "Superfund Program Proposed Plan, U.S. Smelter and Lead Refinery Superfund Site – Operable Unit 1 East Chicago, Indiana." U.S. Environmental Protection Agency, Region 5. July 12.

EPA 2012b. "Record of Decision, US Smelter and Lead Refinery, Inc. Superfund Site, Operable Unit 1, East Chicago, Indiana." U.S. Environmental Protection Agency, Region 5. November 30.

EPA 2014. "RAC II Region 5 Statement of Work for Remedial Design (OU1), US Smelter and Lead Residential Area Superfund Site." June 17.

EPA 2016. "FIELDS Analysis of the USS Lead XRF and Lab Results for Lead and Arsenic." August 29.

Geochemical Solutions 2001. "Site-Wide Sampling and Analysis Report." July 24.

Geochemical Solutions 2004. "Draft Final USS Lead Modified RCRA Facility Investigation (MRFI) Report." March 1.

Parsons. 2016. "Temporary Storage, Transportation, and Disposal Plan, Zone 3, USS Lead Superfund Site, East Chicago, Lake County, Indiana." September 12.

Section 800 of the Indiana Department of Transportation Standard Specifications http://www.in.gov/dot/div/contracts/standards/rsp/archive/sep01/sep.htm.

Resource Consultants, Inc. (RCI) 1990. "Site Assessment Plan, U.S.S. Lead Refinery, Inc., East Chicago, Indiana", RCI Project No. 1-3214.00. August 3.

SulTRAC 2012a. "Final Remedial Investigation Report, Draft, U.S. Smelter and Lead Refinery (USS Lead) Superfund Site, Lake County, Indiana." June 20.

SulTRAC 2012b. "Feasibility Study Report, Final, U.S. Smelter and Lead Refinery (USS Lead) Superfund Site, Lake County, Indiana." June 20.

SulTRAC 2014. "Work Plan, Remedial Design for US Smelter and Lead Residential Area Superfund Site (OU1), East Chicago, Lake County, Indiana." July 21.

SulTRAC 2015. "Preliminary Remedial Design for U.S. Smelter and Lead Residential Area Superfund Site, East Chicago, Lake County, Indiana." May 15.

SulTRAC 2016. "Final Remedial Design for High Priority Zone 3 Properties, U.S. Smelter and Lead Residential Area Superfund Site, East Chicago, Lake County, Indiana." September 15.

SulTRAC 2017a. "Draft Remedial Design for 120 Zone 3 Properties, U.S. Smelter and Lead Residential Area Superfund Site East Chicago, Lake County, Indiana." February 2.

SulTRAC 2017b. "Draft Final Remedial Design for Zone 3 Properties and Carrie Gosch Elementary School, U.S. Smelter and Lead Residential Area Superfund Site East Chicago, Lake County, Indiana." March 3.

U.S. Smelter and Lead Refinery Consent Decree, September 3, 2014, ECF 2:14-cv-00312 Doc. 2-1.

Weston Solutions, Inc. (Weston) 2009. "Federal On-Scene Coordinator's Report, Rev. 1 Comprehensive Environmental Response, Compensation, and Liability Act, Removal Action at the USS Lead Site, East Chicago, Lake County, Indiana, Site ID 053J." August 31.

TABLES

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
455 E 148th St (Carrie Gosch Elementary School)		71	3,549
Non Responsive	X	0	24
Non Responsive		0	10
Non Responsive	X	3	32
Non Responsive	X	0	13
Non Responsive	X	6	51
Non Responsive	X	0	40
Non Responsive	X	0	104
Non Responsive	X	29	28
Non Responsive	X	11	55
Non Responsive	X	8	48
Non Responsive	X	12	94
Non Responsive	X	11	98
Non Responsive	X	16	100
Non Responsive		13	20
Non Responsive		2	7
Non Responsive		21	13
Non Responsive		0	22
Non Responsive	X	0	18

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
Non Responsive		1	24
Non Responsive	X	3	26
Non Responsive		1	68
Non Responsive		0	142
Non Responsive		4	65
Non Responsive		0	36
Non Responsive		8	73
Non Responsive	X	8	27
Non Responsive		0	28
Non Responsive	X	6	193
Non Responsive		0	51
Non Responsive		8	54
Non Responsive		2	97
Non Responsive		1	88
Non Responsive	X	2	52
Non Responsive		11	48
Non Responsive		2	45
Non Responsive	X	0	14
Non Responsive		16	28
Non Responsive		8	50

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
Non Responsive	X	10	44
Non Responsive		2	61
Non Responsive		5	91
Non Responsive		7	81
Non Responsive		16	20
Non Responsive	X	7	69
Non Responsive		6	47
Non Responsive		11	145
Non Responsive	X	1	10
Non Responsive		47	281
Non Responsive		0	86
Non Responsive	X	27	220
Non Responsive		6	75
Non Responsive		0	16
Non Responsive		0	33
Non Responsive	X	0	42
Non Responsive		1	22
Non Responsive	X	9	21
Non Responsive		7	61
Non Responsive		0	118

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
Non Responsive		6	12
Non Responsive		4	34
Non Responsive	X	2	19
Non Responsive		0	40
Non Responsive		0	23
Non Responsive		4	70
Non Responsive		0	16
Non Responsive		0	28
Non Responsive	X	0	33
Non Responsive	X	7	19
Non Responsive		20	16
Non Responsive	X	16	42
Non Responsive		18	7
Non Responsive		12	126
Non Responsive		24	55
Non Responsive		5	36
Non Responsive		0	233
Non Responsive		3	64
Non Responsive		0	195
Non Responsive		1	96

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
Non Responsive		20	156
Non Responsive		4	76
Non Responsive	X	0	23
Non Responsive		0	73
Non Responsive	X	0	8
Non Responsive	X	5	77
Non Responsive	X	3	183
Non Responsive	X	3	44
Non Responsive	X	0	31
Non Responsive	X	0	76
Non Responsive		0	84
Non Responsive		0	38
Non Responsive		2	232
Non Responsive		1	14
Non Responsive		1	25
Non Responsive		0	12
Non Responsive		2	18
Non Responsive		1	20
Non Responsive		9	15
Non Responsive		0	54

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
Non Responsive		0	229
Non Responsive		0	44
Non Responsive		6	67
Non Responsive		0	23
Non Responsive		5	69
Non Responsive		0	54
Non Responsive		7	37
Non Responsive		0	444
Non Responsive		3	23
Non Responsive	X	0	57
Non Responsive		0	127
Non Responsive		0	553
Non Responsive		0	91
Non Responsive		0	44
Non Responsive		0	261
Non Responsive		0	41
Non Responsive		8	31
Non Responsive		0	11
Non Responsive		0	280
Non Responsive		2	647

Table 1 Estimated Volumes of Zone 3 Excavations
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Full Address	High Priority	Total Volume (yds^3)	
		Manual	Mechanical
Non Responsive		2	285
Non Responsive		66	232
Total		**714**	**13,142**
Total Manual & Mechanical		**13,856**	
Number of Properties		**121**	
Average Excavation Volume		**114.5**	

Table 2 Backfill Quality Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Analyte Name	Soil RSL (mg/kg)
HERBICIDES	
2,4,5-T (Trichlorophenoxyacetic Acid)	630
Silvex (2,4,5-TP)	510
2,4-D	700
2,4-DB	510
Dalapon	1900
Dicamba	1900
Dinoseb	63
MCPA	32
MCPP	63
METALS	
Arsenic[1]	14.1
Barium	15,000
Cadmium	71
Chromium, Total	120,000
Lead[1]	56.6
Mercury	11
Selenium	390
Silver	390
PAHs[2]	
2-Methylnaphthalene	340
Acenaphthene	5,000
Anthracene	25,000
Benzo(a)anthracene	2.2
Benzo(a)pyrene	0.22
Benzo(b)fluoranthene	2.2
Benzo(k)fluoranthene	22
Chrysene	220
Dibenz (a, h) anthracene	0.22
Fluoranthene	3,400
Fluorene	3,400

Table 2 Backfill Quality Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Analyte Name	Soil RSL (mg/kg)
PAHs[2] (continued)	
Indeno(1,2,3-CD) pyrene	2.2
Naphthalene	53
Pyrene	2,500
PCBs	
PCB-1016 (Arochlor 1016)	4.1
PCB-1221 (Arochlor 1221)	0.2
PCB-1232 (Arochlor 1232)	0.17
PCB-1242 (Arochlor 1242)	0.23
PCB-1248 (Arochlor 1248)	0.23
PCB-1254 (Arochlor 1254)	0.24
PCB-1260 (Arochlor 1260)	0.24
PESTICIDES	
Aldrin	0.04
alpha-BHC	0.09
beta-BHC	0.3
gamma-BHC	0.57
Chlordane[3]	1.7
DDD	2.3
p,p'-DDE	2
DDT	1.9
Dieldrin	0.03
Endosulfan	470
Endrin	19
Heptachlor	0.13
Heptachlor epoxide	0.07
Methoxychlor	320
Toxaphene	0.49
SVOCs	
1,1'-Biphenyl	47
1,2,4,5-Tetrachlorobenzene	23
2,2'-Oxybis(1-chloropropane)	3,100

Table 2 Backfill Quality Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Analyte Name	Soil RSL (mg/kg)
SVOCs (continued)	
2,3,4,6-Tetrachlorophenol	1,900
2,4,5-Trichlorophenol	6,300
2,4,6-Trichlorophenol	49
2,4-Dichlorophenol	190
2,4-Dimethylphenol	1,300
2,4-Dinitrophenol	130
2,4-Dinitrotoluene	1.7
2,6-Dinitrotoluene	0.36
2-Chloronaphthalene	4,800
2-Chlorophenol	390
2-Methylphenol	3,200
2-Nitroaniline	630
3,3'-Dichlorobenzidin	1.2
4,6-Dinitro-2-methylphenol	5.1
4-Chloro-3-methylpheno	6,300
4-Chloroaniline	2.7
4-Nitroaniline	27
Acetophenone	7,800
Atrazine	2.4
Benzaldehyde	170
Butylbenzylphthalate	290
bis(2-Chloroethoxy) Methane	190
bis(2-Chloroethyl) ether	0.23
bis(2-Ethylhexyl)phthalate	39
Caprolactam	31,000
Dibenzofuran	73
Diethyl Phthalate	51,000
Dimethyl Phthalate[4]	1,100
Di-N-Butyl Phthalate	6,300
Di-N-Octylphthalate	630
Hexachlorobenzene	0.21

Table 2 Backfill Quality Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Analyte Name	Soil RSL (mg/kg)
SVOCs (continued)	
Hexachlorobutadiene	1.2
Hexachlorocyclopentadiene	1.8
Hexachloroethane	1.8
Isophorone	570
Nitrobenzene	5.1
N-Nitrosodi-N-propylamine[5]	0.078
N-Nitrosodiphenylamine	110
Pentachlorophenol	1
Phenol	19,000
VOCs	
1,1,1-Trichloroethane	8,100
1,1,2,2-Tetrachloroethane	0.6
1,1,2-Trichloro-1,2,2-Trifluoroethane	40,000
1,1,2-Trichloroethane	1.1
1,1-Dichloroethane	3.6
1,1-Dichloroethene	230
1,2,3-Trichlorobenzene	63
1,2,4-Trichlorobenzene	24
1,2-Dibromo-3-chloropropane	0.01
1,2-Dibromoethane	0.04
1,2-Dichlorobenzene	1800
1,2-Dichloroethane	0.46
1,2-Dichloropropane	1
1,4-Dichlorobenzene	2.6
1,4-Dioxane (P-Dioxane)	5.3
2-Butanone	27,000
2-Hexanone	200
4-Methyl-2-pentanone	33,000
Acetone	61,000
Benzene	1.2
Bromochloromethane	150

Table 2 Backfill Quality Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Analyte Name	Soil RSL (mg/kg)
VOCs (continued)	
Bromodichloromethane	0.29
Bromoform	19
Bromomethane	6.8
Carbon disulfide	770
Carbon tetrachloride	0.65
Chlorobenzene	280
Chloroethane	14,000
Chloroform	0.32
Chloromethane	110
cis-1,2-Dichloroethene	160
cis-1,3-Dichloropropene	1.8
Cyclohexane	6,500
Dibromochloromethane	8.3
Dichlorodifluoromethane	87
Ethylbenzene	5.8
Isopropylbenzene	1,900
m,p-Xylene	550
Methyl Tert-butyl Ether	47
Methyl Acetate	78,000
Methylene chloride	57
o-Xylene	650
Styrene	6,000
Tetrachloroethene	24
Toluene	4,900
trans-1,2-Dichloroethene	1,600
trans-1,3-Dichloropropene	1.8
Trichloroethene	0.94
Trichlorofluoromethane	23,000
Vinyl chloride	0.06
Xylenes (total)	580

Footnotes:

[1] 14.1 mg/kg is the site-specific background concentration for arsenic. 56.6 mg/kg is the background threshold value [BTV] for lead in 6- to 12-inch soils (SulTRAC 2012).

[2] For PAHs, backfill must not exceed the higher of the EPA RSL or the Tiered Approach to Corrective Action (TACO) metropolitan areas concentration.

[3] Chlordane is a mixture of chemicals; the major components include trans-chlordane, cis-chlordane, and heptachlor (ATSDR Toxicological Profile for Chlordane). The sum of concentrations of these compounds must not exceed the listed RSL for chlordane.

[4] Indiana Department of Environmental Management (IDEM) has established a default closure limit of 1,100 mg/kg for dimethyl phthalate in soil.

[5] Commonly employed analytical methods are unable to achieve a detection limit lower than the RSL for N-Nitrosodi-N-propylamine, therefore this compound has been excluded from the list of required backfill chemical quality analytes.

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
CLEAN AIR ACT (CAA) of 1974				
40 CFR 7401	The Act is intended to protect the quality of air and promote public health. Title I of the Act directed the U.S. Environmental Protection Agency (EPA) to publish national ambient air quality standards for "criteria pollutants." In addition, EPA has provided national emission standards for hazardous air pollutants under Title III of the Act. Hazardous air pollutants are also designated hazardous substances under CERCLA. The Clean Air Act amendments of 1990 greatly expanded the role of National Emission Standards for Hazardous Air Pollutants by designating 179 new hazardous air pollutants and directed EPA to attain maximum achievable control technology standards for emission sources. Such emission standards are potential ARARs if selected remedial technologies produce air emissions of regulated hazardous air pollutants.	Action- Specific	Potentially Applicable	The Act is considered an ARAR for remedies that involve creation of air emissions, such as excavation activities that might create dust. Also includes emissions rules which apply to equipment working on the project (based on date of manufacture and/or rebuild and/or overhaul).
FLOODPLAIN MANAGEMENT EXECUTIVE ORDER No. 11988				
40 CFR Part 6, Appendix A	Requires federal agencies to evaluate the potential adverse effects associated with direct and indirect development of a floodplain. Alternatives that involve modification/construction within a floodplain may not be selected unless a determination is made that no practicable alternative exists. If no practicable alternative exists, potential harm must be minimized and action taken to restore and preserve the natural and beneficial values of the floodplain.	Location-Specific	Potentially Applicable	Determined by Grand Calumet River floodplain

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
CLEAN WATER ACT (CWA) OF 1977				
Protection of Wetlands Executive Order 11990 [40 CFR Part 6, Appendix A]	Under this Order, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands. If remediation is required within wetland areas and no practical alternative exists, potential harm must be minimized and action taken to restore natural and beneficial values.	Location-Specific	To Be Considered	Determined by location of wetlands, if any, along Grand Calumet River
Federal Water Pollution Control Act Section 401: Water Quality Certification	Establishes a permit program to regulate a discharge into the navigable waters of the U.S., including wetlands.	Chemical- Specific	Relevant and Appropriate	Depends on nature of remedial action chosen.
National Pollutant Discharge Elimination System (NPDES) 33 U.S.C. §§1251-1387 Clean Water Act NPDES Permit Program (40 CFR 122)	Regulates discharges of pollutants to navigable waters.	Action-Specific and may be Chemical-specific	Relevant and Appropriate	Depends on nature of remedial action chosen. Applies to disturbances of one acre or more of total land area and disturbances of less than one acre of land that are part of a larger common plan of development or sale if the larger common plan will ultimately disturb one or more acres of land.
FISH AND WILDLIFE COORDINATION ACT				
Fish and Wildlife Coordination Act; 16 U.S.C. §§661 et seq. 16 USC 742a	Actions that affect species/habitat require consultation with U.S. Department of Interior, U.S. Fish and Wildlife Service, and National Marine Fisheries Service, and/or state agencies, as appropriate, to ensure that proposed actions do not	Location-Specific	Potentially Applicable	

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
16 USC 2901 40 CFR 6.302 50 CFR 402	jeopardize the continued existence of the species or adversely modify or destroy critical habitat. The effects of water-related projects on fish and wildlife resources must be considered. Action must be taken to prevent, mitigate, or compensate for project-related damages or losses to fish and wildlife resources. Consultation with the responsible agency is also strongly recommended for on-site actions. Under 40 CFR Part 300.38, these requirements apply to all response activities under the National Contingency Plan.			
RESOURCE CONSERVATION AND RECOVERY ACT OF 1976				
Off-Site Land Disposal Subtitle C [40 CFR 260-268]	Soil and/or sediment that is excavated for off-site disposal and constitutes a hazardous waste must be managed in accordance with the requirements of RCRA.	Action-Specific	Potentially Applicable	Depends on nature of remedial action chosen
Land Disposal Restrictions [40 CFR 268.2]	The land disposal restrictions (LDR) provide a second measure of protection from threats posed by hazardous waste disposal by ensuring that hazardous waste cannot be placed on the land until the waste meets specific treatment standards to reduce the mobility or toxicity of its hazardous constituents. Hazardous waste destined for land disposal must meet the applicable Land Disposal Regulations of 40 CFR 268.	Action-Specific and Chemical-Specific	Relevant and Appropriate	Depends on nature of remedial action chosen
Off-Site Land Disposal Subtitle D [40 CFR 258]	Criteria for Municipal Solid Waste Landfills, establishes requirements for the operation of landfills accepting non-hazardous solid waste. These	Action-Specific	Potentially Applicable	Depends on nature of remedial action chosen

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
	requirements would be applicable to facilities used for the disposal of non-hazardous soil and/or sediment.			
Criteria for Municipal Solid Waste Landfills for Site Capping [40 CFR 258, Subpart F]	Provides minimum standards for cover systems at solid-waste disposal facilities.	Action-Specific	Potentially Relevant and Appropriate	Depends on nature of remedial action chosen
Definition of a hazardous waste [40 CFR 261.3(d) and 329 IAC 3.1]	For all hazardous waste related equipment, remove or decontaminate all hazardous waste residues, contaminated containment components, contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous unless 40 CFR 261.3(d) applies	Chemical-specific	Relevant and Appropriate	
Hazardous waste determination [40 CFR 262.11 and 329 IAC 3.1-6]	Requires that a proper hazardous waste determination must be made on all wastes generated from remedial actions.	Chemical-specific	Relevant and Appropriate	
Pre-Transportation Requirements [40 CFR 262.30, 262.31, 262.32, and 262.33 and 329 IAC 3.1-7 and 329 IAC 3.1-8]	All hazardous waste must be properly packaged, with labels, markings, and placards, prior to transport.	Chemical-specific	Relevant and Appropriate	
Standards applicable to the generators of hazardous waste - The manifest [40 CFR 262, Subpart B and 329 IAC 3.1-7 and 329 IAC 3.1-8]	Hazardous waste stored onsite in containers for greater than 90 days shall be managed in accordance with 40 CFR 262, Subpart B (329 IAC 3.1-7 and 329 IAC 3.1-8).	Chemical-specific	Potentially Applicable	

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
Standards applicable to the generators of hazardous waste - The manifest [40 CFR 262, Subpart B and 329 IAC 3.1-7 and 329 IAC 3.1-8]	Hazardous waste must be manifested as such for transport to a permitted treatment, storage, or disposal facility (TSDF)	Chemical-specific	Relevant and Appropriate	
Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities - Waste piles [40 CFR 264, Subpart L]	Any excavated contaminated soils must not be placed back on the ground so as to create a waste pile. Covered roll offs may be used.	Chemical-specific	Relevant and Appropriate	
Use and management of containers [40 CFR 265, Subpart I and 329 IAC 3.1-10]	Hazardous waste stored onsite in containers for 90 days or less shall be managed in accordance with the standards of 40 CFR 265, Subpart I (329 IAC 3.1-10).	Chemical-specific	Relevant and Appropriate	
ENDANGERED SPECIES ACT				
Endangered Species Act [16 USC 1531]; 50 CFR 200	Requires that federal agencies ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat.	Location- Specific	Potentially applicable	No endangered species are known to be present on the site that would be affected by remedial actions.
NATURAL HISTORIC PRESERVATION ACT				
National Historic Preservation Act	Establishes procedures to provide for preservation of scientific, historical, and archaeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally	Location- Specific	Potentially applicable	No part of the USS Lead Residential Area is listed on the national register of historic places. Potentially applicable during remedial activities if scientific,

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
[16 USC 661 et seq.] 36 CFR Part 65	licensed activity or program. If scientific, historical, or archaeological artifacts are discovered at the site, work in the area of the site affected by such discovery will be halted pending a completion of any data recovery and preservation activities required pursuant to the act and any implementing regulations.			historic, or archaeological artifacts are identified during implementation of the remedy.
DEPARTMENT OF TRANSPORTATION				
Requirements for the Transport of Hazardous Materials [40 CFR 172]	Transportation of hazardous materials on public roadways must comply with the requirements.	Action-Specific	Potentially Applicable	Depends on nature of remedial action chosen
OTHER FEDERAL GUIDELINES TO BE CONSIDERED				
Integrated Risk Information System (IRIS)	Risk reference doses (RfD) are estimates of daily exposure levels that are unlikely to cause adverse non-carcinogenic health effects over a lifetime. Cancer Slope Factors (CSF) are used to compute the incremental cancer risk from exposure to site contaminants and represent the most up-to-date information on cancer risk from EPA's Carcinogen Assessment Group.	Chemical- Specific	To Be Considered	
EPA Regional Screening Levels	EPA Regional Screening Levels (RSLs and associated guidance necessary to calculate them) are risk-based tools for evaluating and cleaning up contaminated sites. The RSLs represent Agency guidelines and are not legally enforceable standards.	Chemical-Specific	To Be Considered	
Occupational Safety and Health Act [29 CFR 61]	The Act was passed in 1970 to ensure worker safety on the job. Worker safety at hazardous waste sites is addressed under 29 CFR 1910.120: Hazardous Waste	Action-specific	Potentially Applicable	The Act is considered an ARAR for construction activities performed during the implementation of remedies.

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
	Operations and Emergency Response. General worker safety is covered elsewhere within the law.			Depends on nature of remedial action chosen.
INDIANA ADMINISTRATIVE CODE				
Indiana Solid Waste Rules (IAC Title 329)	This law applies to remedies that involve off-site disposal of materials typically involved with excavations. Contaminated soils or wastes that are excavated for off-site disposal would be tested for hazardous waste characteristics and requirements of the Rules would be followed if hazardous waste is found.	Action - Specific	Potentially Relevant and Appropriate	Depends on nature of remedial action chosen.
Generator Responsibilities for Waste Information (329 IAC 10-7.2-1)	Requires all wastes undergo a waste determination, and if found to be nonhazardous, be disposed of in a permitted solid waste disposal facility.	Chemical-specific	Relevant and Appropriate	
Indiana Air Pollution Control Regulations (IAC Title 326)	This law applies to the regulation air emissions, for activities such as excavation, that have the potential to create dust.	Action-Specific	Potentially Relevant and Appropriate	Depends on nature of remedial action chosen.
Rule 4. Fugitive Dust Emission (326 IAC 6-4-1[4])	Rule 4 establishes that visible fugitive dust must not escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located.	Location/Action-specific	Relevant and Appropriate	
Motor vehicle fugitive dust sources (326 IAC 6-4-4)	No vehicle driven on any public right of way may allow its contents to escape and form fugitive dust.	Action-Specific	Relevant and Appropriate	
Ground Water Quality Standards (327 IAC 2-11-2(e))	States that no person shall cause the groundwater in a drinking water supply well to have contaminant concentration that results in an exceedance of	Chemical-specific	Potentially Applicable	Groundwater is being considered under future actions at OU2.

Table 3: Applicable or Relevant and Appropriate Requirements
USS Lead Superfund Site, OU-1
East Chicago, Indiana

Potential Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Potentially Applicable/ Relevant and Appropriate?	Comment
	numeric criteria contained within the rule for drinking water class groundwater, creates a condition that is injurious to human health, creates an exceedance of specific indicator criteria levels contained within the rule, or renders the well unusable for normal domestic use.			
Contained in Policy Guidance for RCRA	Guidance document on management of remediation waste. This guidance document does not have the effect of law.	Chemical-specific	To Be Considered	
CITY OF EAST CHICAGO				
Ordinance for the Control of Storm water	Regulates the capture and conveyance of storm water runoff in order to mitigate the damaging effects of storm water runoff; correct storm water collection and conveyance problems; protect public health, welfare, safety, and the environment, and fund the activities of storm water management including design, planning, regulation, education, coordination, construction, operation, maintenance, inspection, and enforcement activities. Based on CWA NPDES regulations.	Action-specific	Relevant and Appropriate	Depends on nature of remedial action chosen. Applies to disturbances of one acre or more of total land area and disturbances of less than one acre of land that are part of a larger common plan of development or sale if the larger common plan will ultimately disturb one or more acres of land.

Notes

ARAR	Applicable/Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CSF	Cancer Slope Factor
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
IAC	Indiana Administrative Code
IC	Indiana Code
IDEM	Indiana Department of Environmental Management
IRIS	Integrated Risk Information System
LDR	Land disposal restrictions
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation and Recovery Act
RISC	Risk Integrated System of Closure
RfD	Risk Reference Dose
RSL	Regional Screening Level
SDWA	Safe Drinking Water Act
TSDF	Treatment, storage, or disposal facility

FIGURES

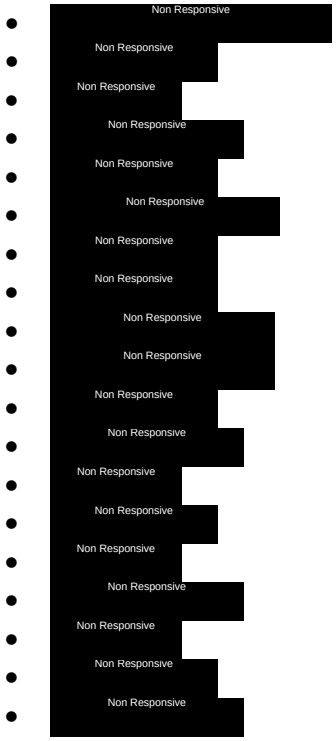
APPENDIX A: REMEDIAL DESIGNS

No changes were made to the remedial design drawings included in the Draft Final Remedial Design. Each remedial design is reproduced in this appendix for completeness. (122 pages)

Please note: 19 remedial designs were previously submitted electronically and are resubmitted here (19 pages):

Remedial Designs from Draft Final (122)

Previously Sumbmitted Designs (19)



APPENDIX B: TECHNICAL SPECIFICATIONS

(45 pages)

APPENDIX C: ANALYTICAL DATA ASSOCIATED WITH PROPERTIES IN THIS REMEDIAL DESIGN DOCUMENT

(6 pages)

APPENDIX D: ACCESS AGREEMENTS (121 PROPERTIES)

(122 pages)

APPENDIX E: ENGINEER'S ESTIMATE OF COST

(19 pages)